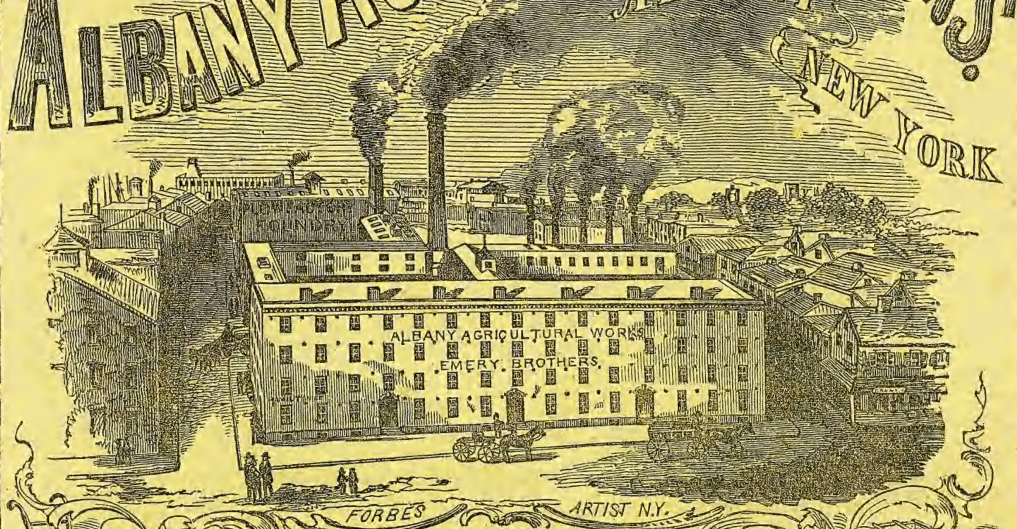


ILLUMINATED CATALOGUE
Of
EMERY BROTHERS
Sole Proprietors of the
ALBANY AGRICULTURAL WORKS
ALBANY
NEW YORK



EMERY BROTHERS,

Nos. 62 and 64 State St., Albany, N. Y.



1860.

RETAIL PRICES

1861.

AND TERMS OF SALE

OF THE LEADING ARTICLES OF MACHINERY AND IMPLEMENTS MADE AT THE
ALBANY AGRICULTURAL WORKS

OF

EMERY BROTHERS,

No. 62 & 64 STATE STREET, ALBANY, N. Y.

The attention of dealers in and purchasers of Agricultural Machinery and Implements, in large or small quantities, to sell again, is especially requested to the following

PRICE LIST,

and a careful perusal of the same is desired.

From these prices liberal discounts will be made to dealers, according to their locality, amount of purchases and terms of payment.

From ten to fifty per cent will be gained in the value of the machines themselves, while the terms will be more liberal than for those from any similar establishment in the country.

Their facilities for manufacturing are unequalled, and of a capacity which enables them to turn out Two Thousand sets of Horse Powers and Threshing Machines, or their equivalent in value of other machinery, annually, which is an important consideration with those engaged in the exportation of such machinery in large quantities and on short notice.

All purchases payable by drafts or notes, payable or maturing in Albany, New York, Boston, Baltimore or Philadelphia, less one-half the cost of exchange on New York.

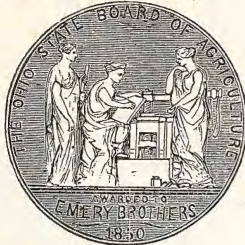
If payable elsewhere, to suit the convenience of purchasers, they must be drawn payable at bank with full exchange on New York.

A credit will be allowed, when desired, on retail sales of four months, with interest, upon good reference being given.

Agents purchasing for the trade will be allowed four months' time, and without interest, or five per cent additional discount for cash purchases.

Two Horse Power, Emerys' Patent, with 14 x 26 in. Threshers and Cleaners, with Bands and Extras, complete,	\$250 00
Two Horse Power, Emerys' Patent, with 14 x 26 in. Thresher and Separator, with bands and Extras, complete,	170 00
One Horse Power, Emerys' Patent, with 12 x 26 in. Thresher and Separator, with bands and Extras, complete,	135 00
Four and Six Horse Lever Power, with 14 x 26 in. Thresher and Cleaner, with bands and Extras, complete,	260 00
Four and Six Horse Lever Power, with 14 x 26 in. Thresher and Separator, with bands and Extras, complete,	175 00
Two Horse Power, Emerys' Patent, with Band Wheel and Extras, without Thresher Bands, &c.,	120 00
One Horse Power, Emerys' Patent, with Band Wheel and Extras, without Thresher Bands, &c.,	90 00
Four and Six Horse Power, with Band Wheel Levers and Extras, without Thresher Bands, &c.,	125 00
Thresher and Cleaner Combined (14 x 26 in. Cylinder), complete, ..	130 00
Thresher and Vibrating Separator (14 x 30 in. Cylinder), complete,	50 00
Thresher and Vibrating Separator (14 x 26 in. Cylinder), complete,	45 00
Thresher and Vibrating Separator (12 x 26 in. Cylinder), complete,	40 00
Clover Huller and Cleaner (14 x 26 in. Cylinder), complete,	100 00
Clover Huller, without Cleaner (14 x 26 in. Cylinder), complete,	75 00

[Continued on page 3 of Cover.]



ILLUMINATED CATALOGUE
OF THE
Albany Agricultural Works,
WARE HOUSE
AND
SEED STORE.
EMERY BROTHERS

PROPRIETORS,
No. 62 & 64 State Street,
ALBANY, N. Y.,
PATENTEES AND MANUFACTURERS

OF
**EMERY'S PATENT CHANGEABLE RAILROAD
HORSE POWER,**

TOGETHER WITH A GREAT VARIETY OF LABOR SAVING
AGRICULTURAL MACHINERY
Of their own construction and invention.

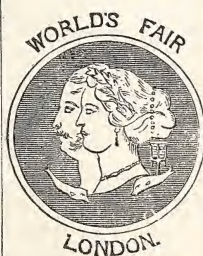
ALSO
GENERAL DEALERS IN IMPLEMENTS & SEEDS.

—*—
This Catalogue embraces a great number and variety of finely
executed and carefully prepared

ILLUSTRATIONS AND DESCRIPTIONS,
together with ample references and indexes as well as the Prices,
Terms of Sale, Weight, Cubic Measurements, Capacity, Directions
for use, Durability and Warranty of their

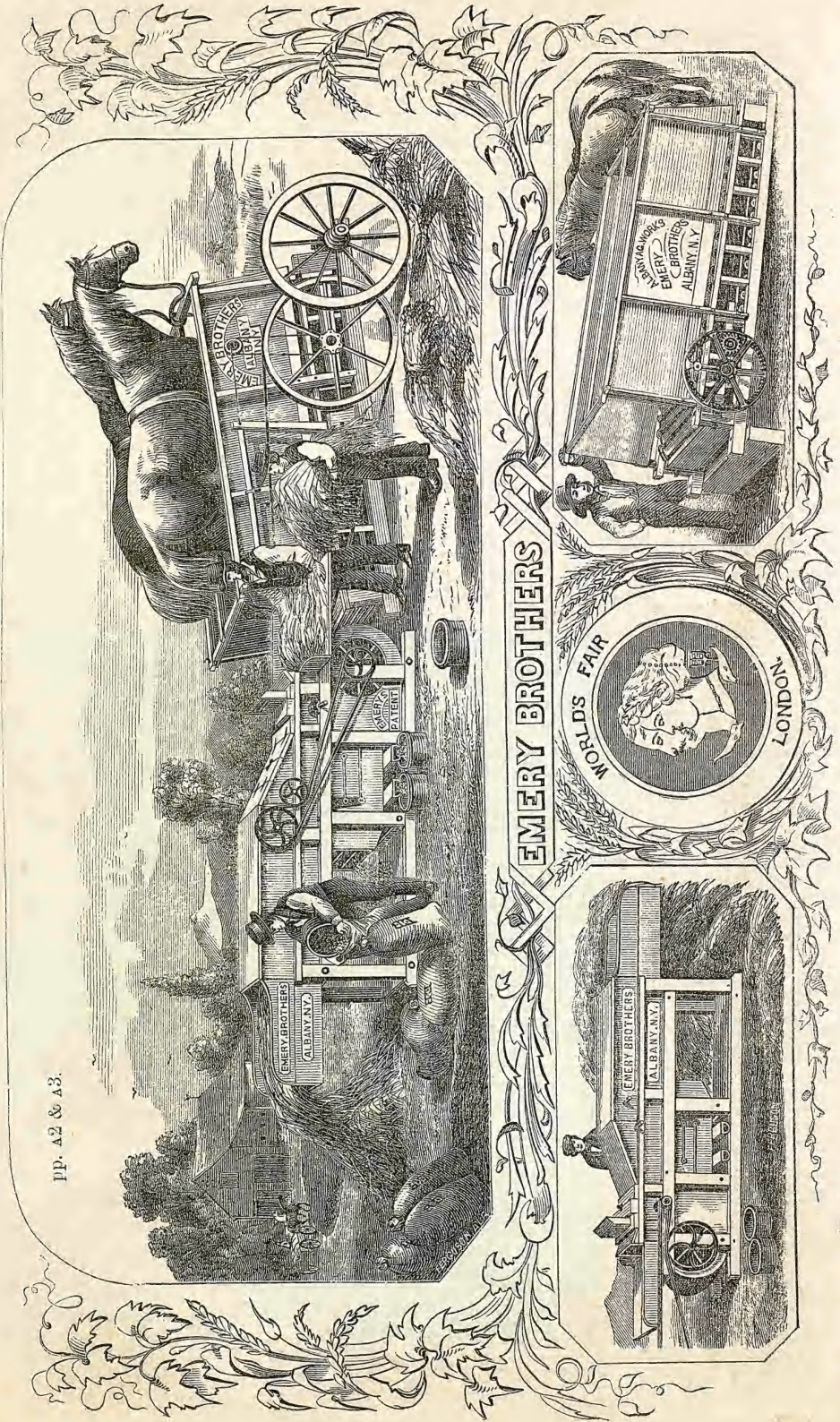
MACHINERY, IMPLEMENTS AND SEEDS.

It has ever been the aim of the proprietors to make none but
the first class of work, and always use the best materials and
workmanship. In the construction of their Horse Power they
have endeavored to adapt it most readily and advantageously to
the great variety of purposes, required by the Farmer and Mechanic.
The same considerations have guided them in the construction and
adaptation of the various Machines made and sold by them, and
to be driven by the power, in calculating the various velocities,
forces, pullies and gears required to enable them to operate to
their maximum efficiency, which is the great secret of their success.

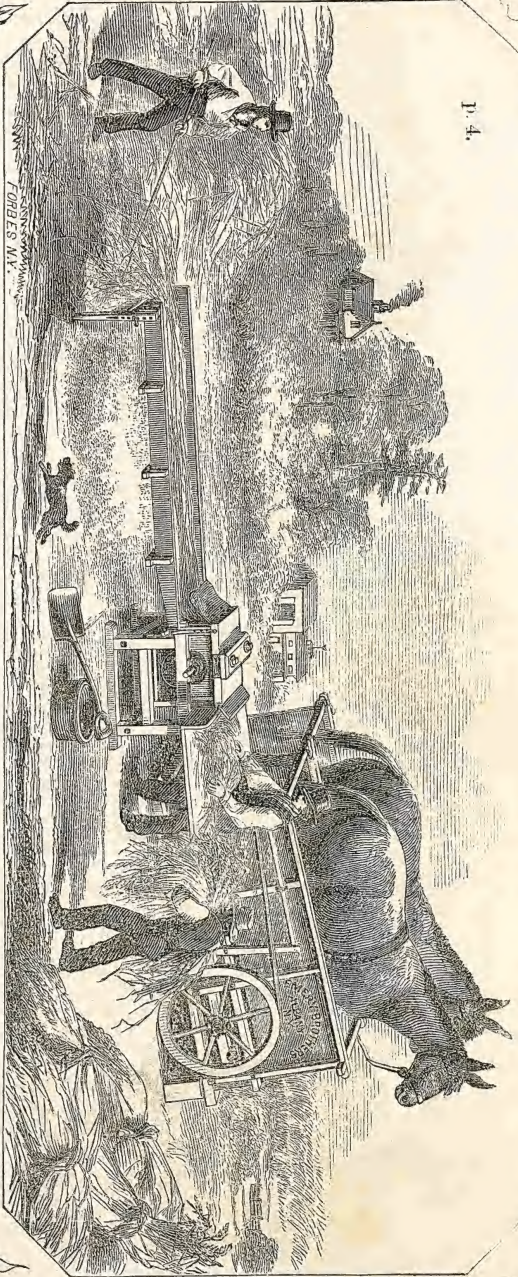


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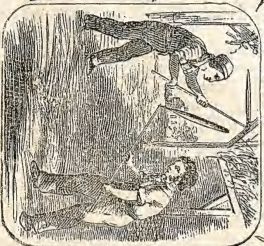
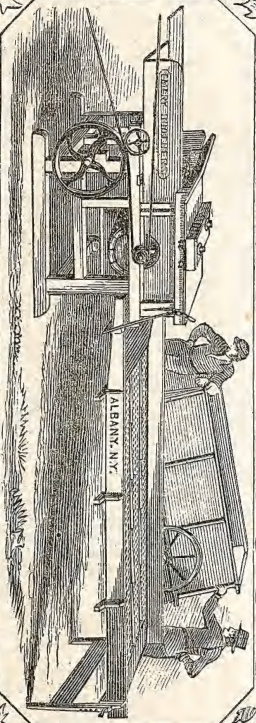


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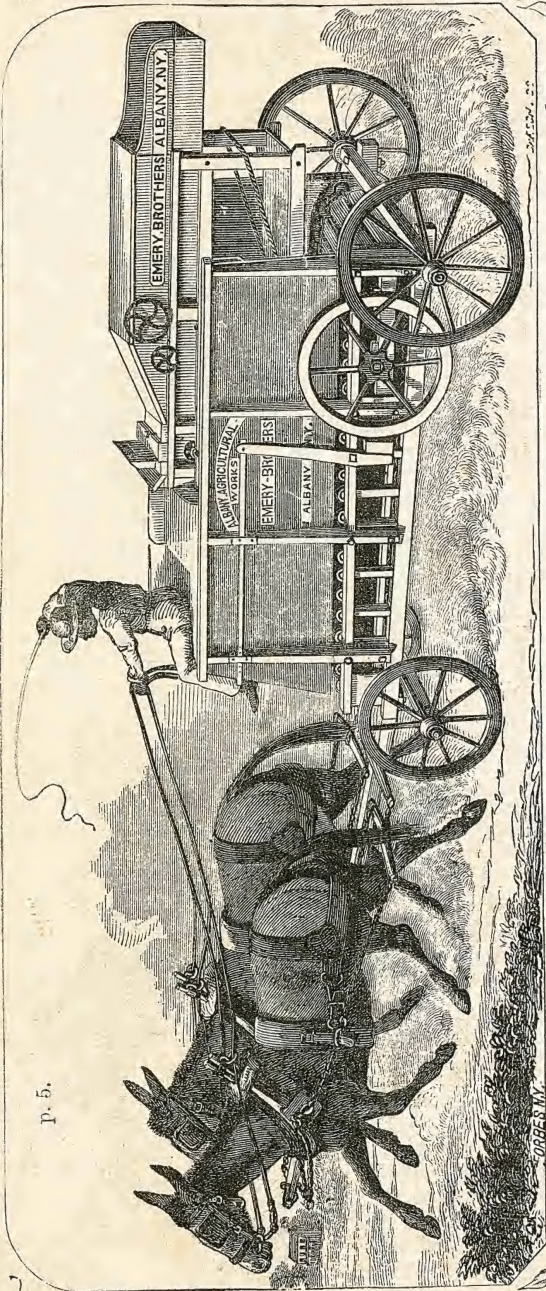


W. L. FORBES, N.Y.

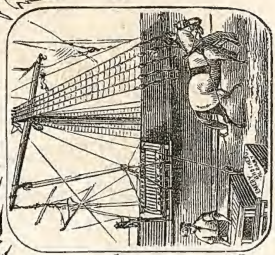
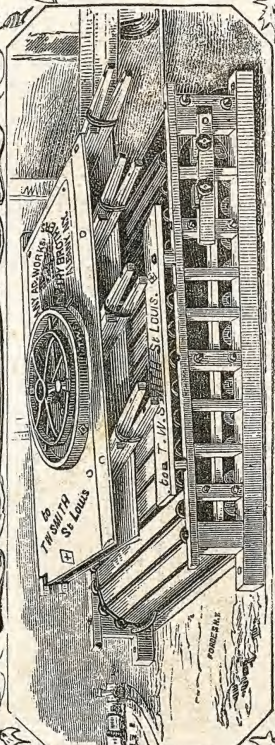
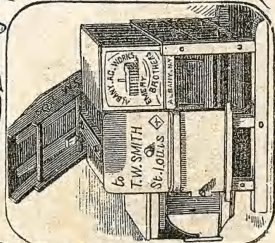
EMERY BROTHERS



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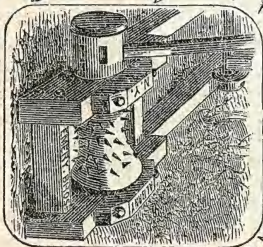
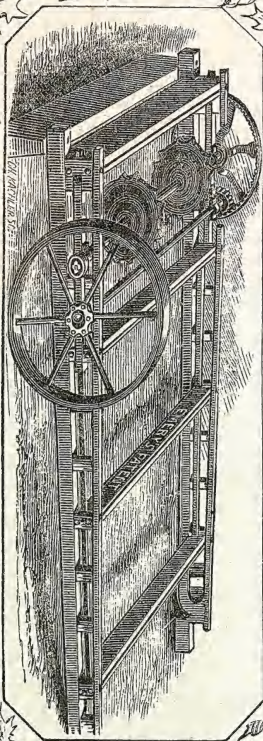
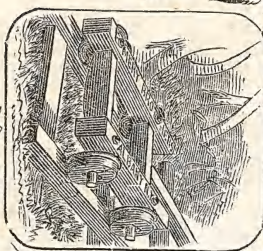
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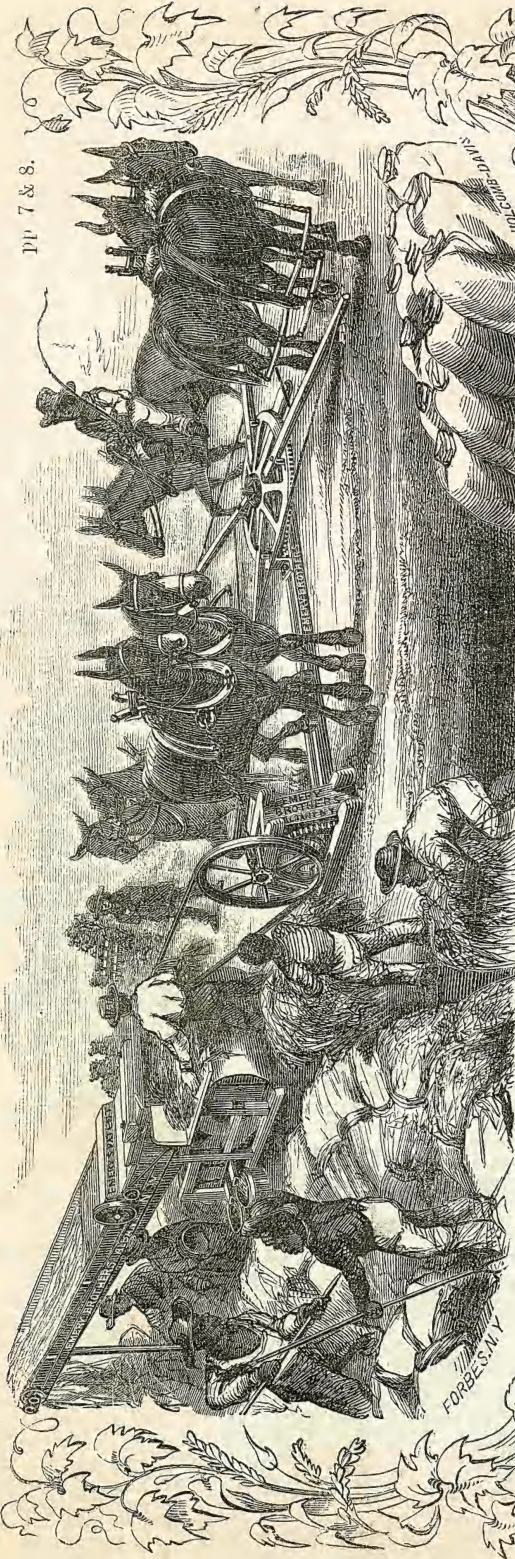
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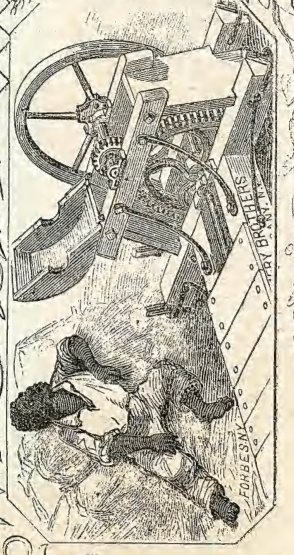
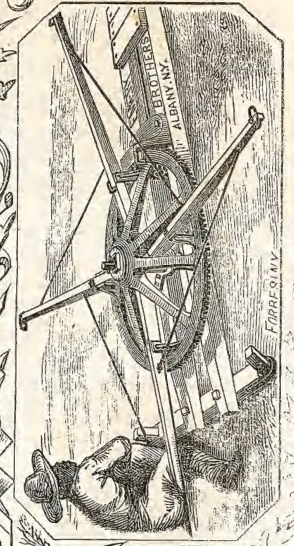
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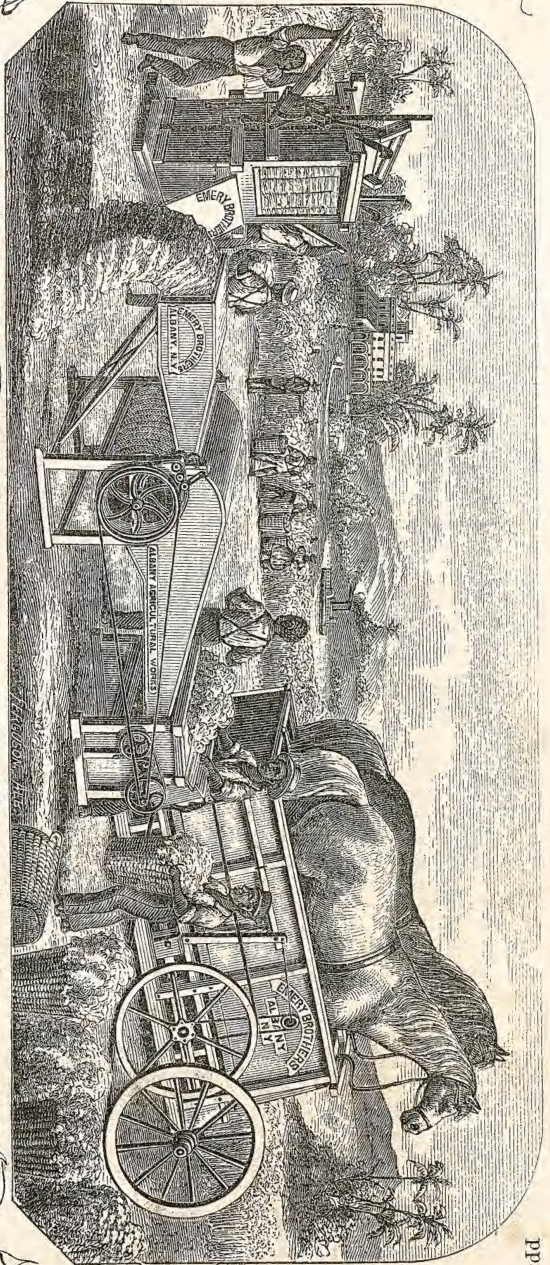


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EMERY BROTHERS



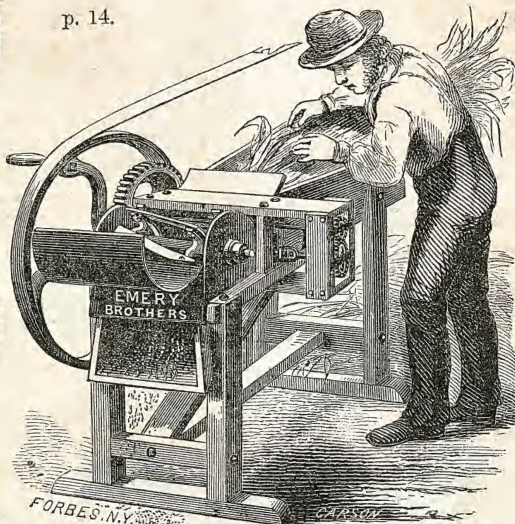


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EMERY BROTHERS

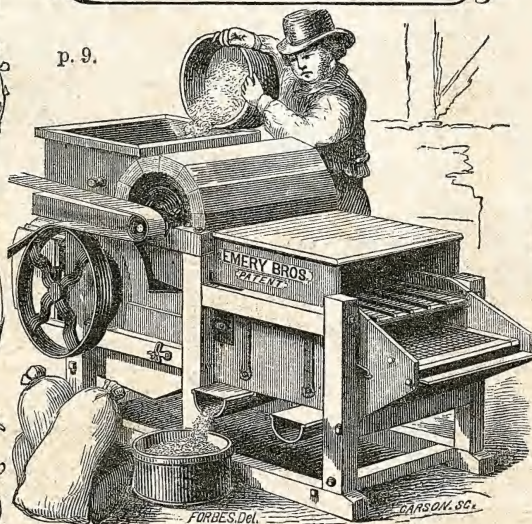


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EMERY BROTHERS.

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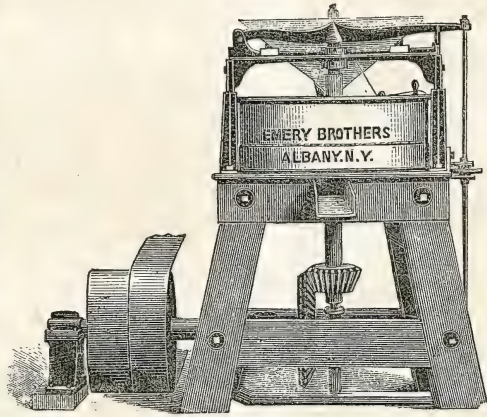


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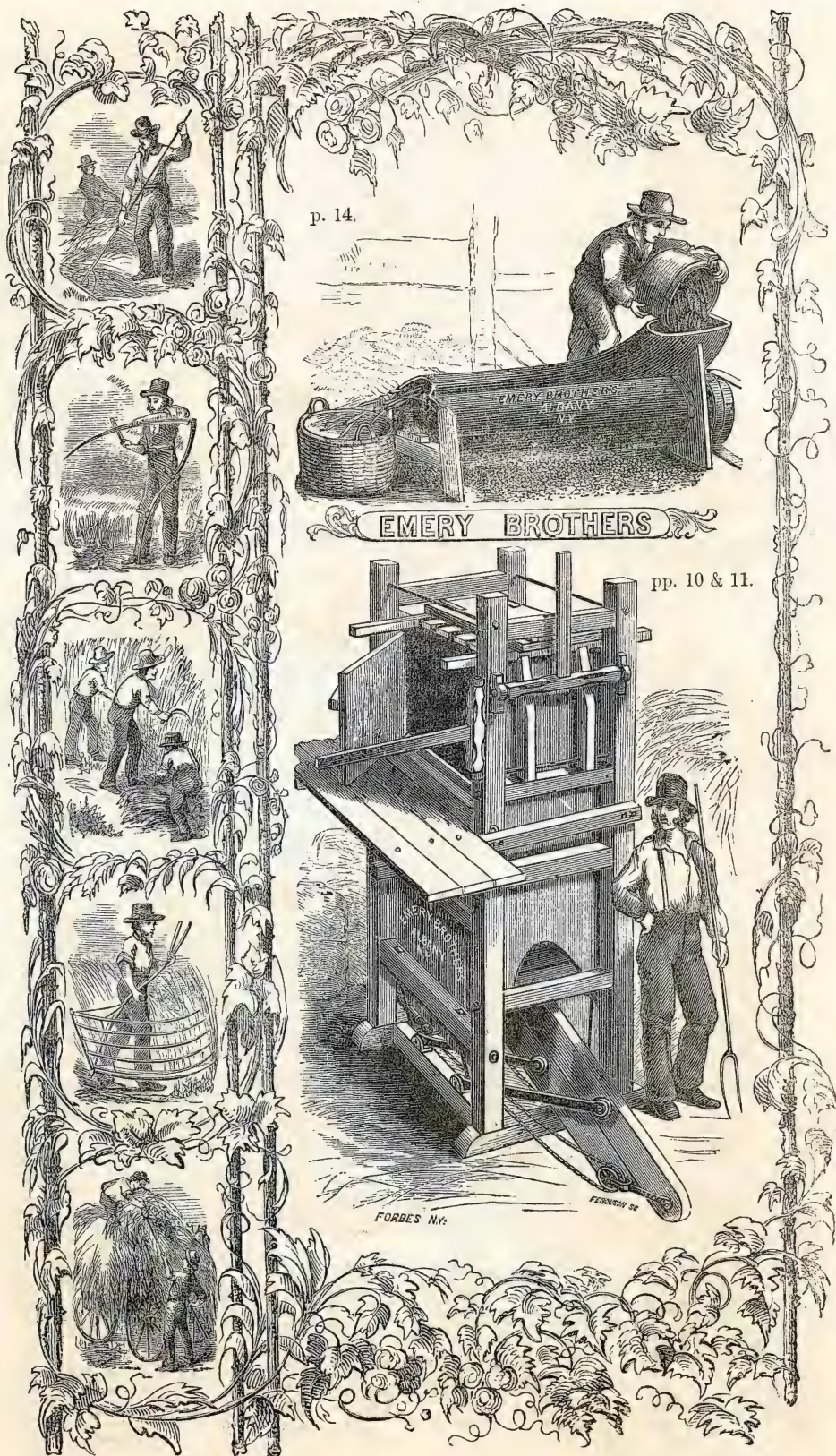
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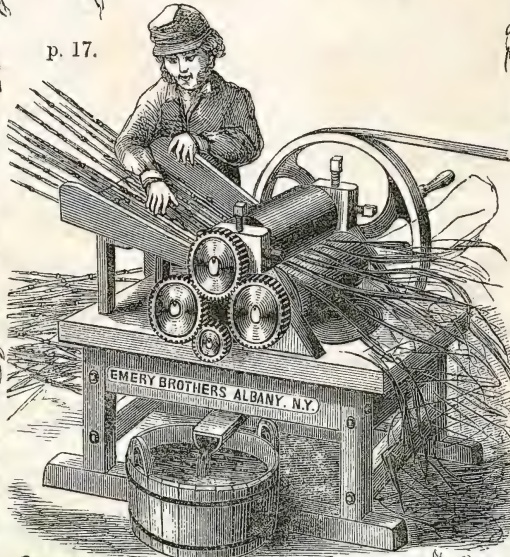
EMERY BROTHERS.

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EMERY BROTHERS

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FORBES N.Y. FERGUSON ALB.



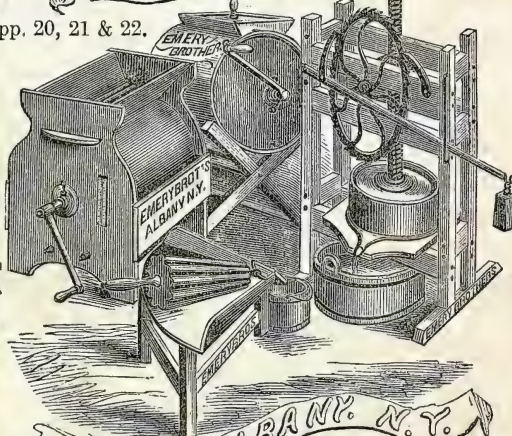


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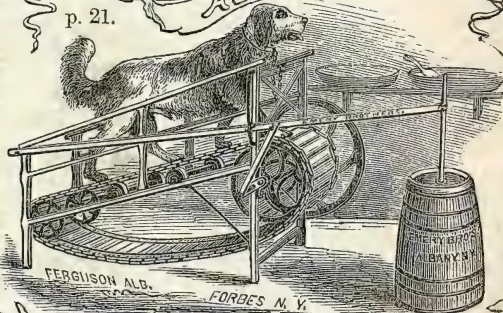
EMERY BROTHERS

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ALBANY N.Y.

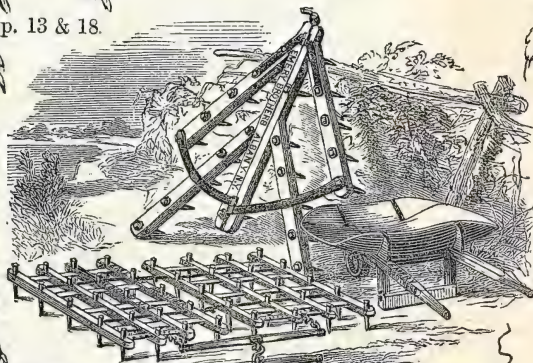
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FERGUSON A.L.D.

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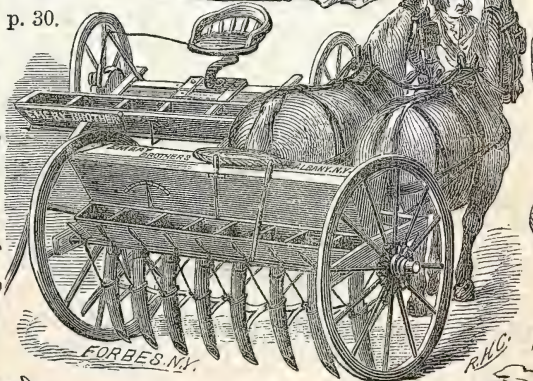
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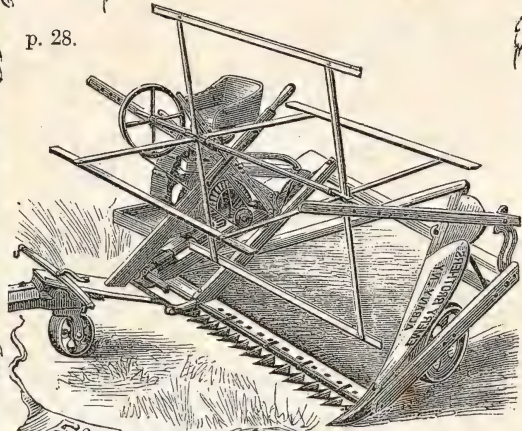


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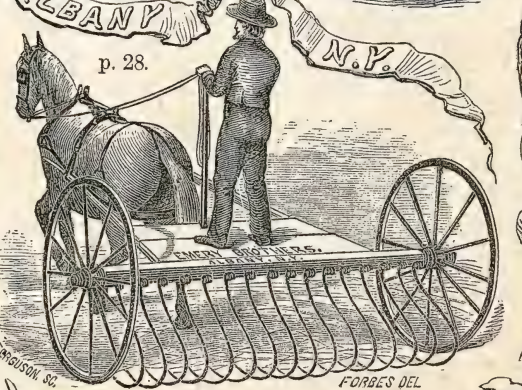
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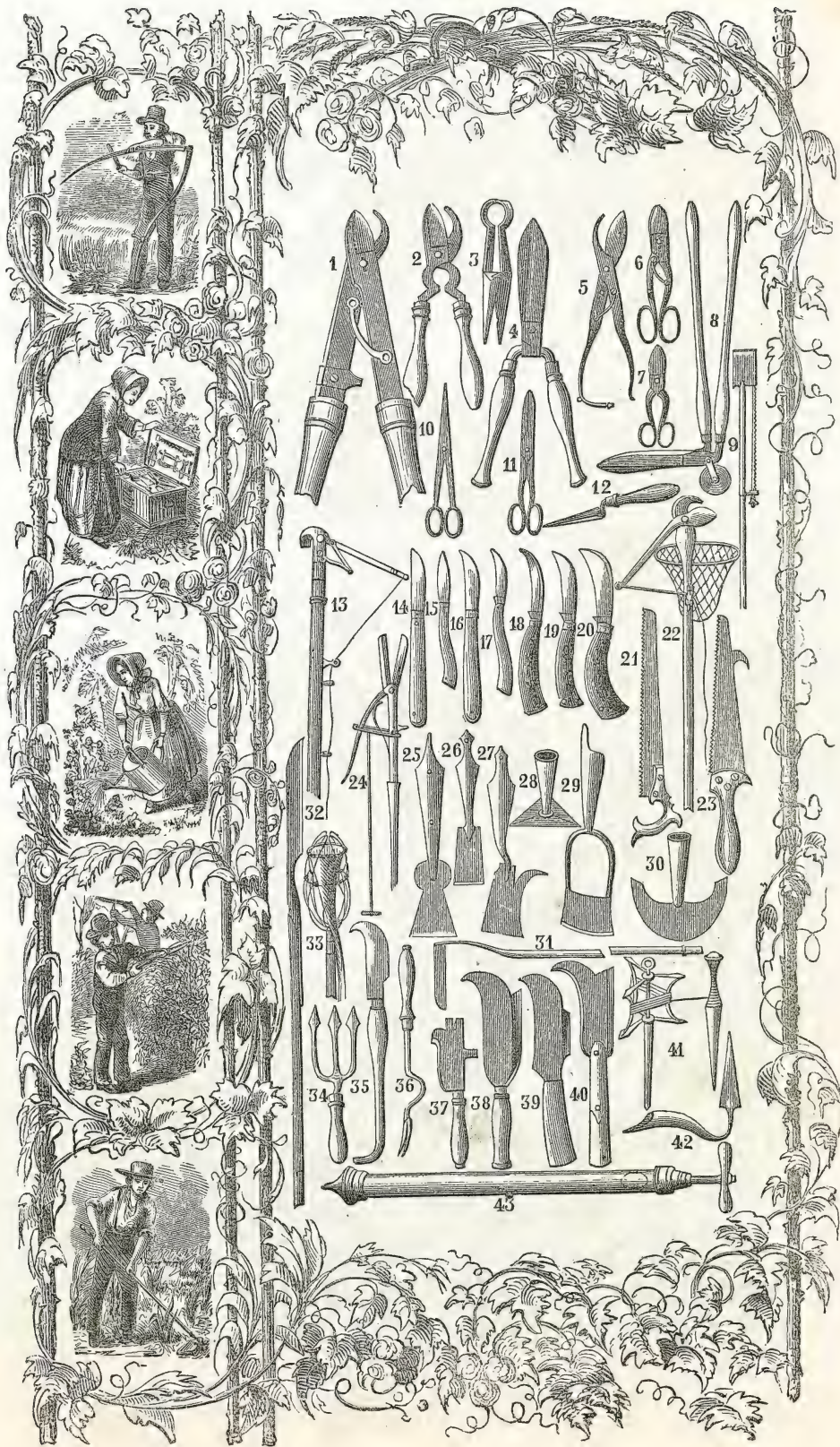


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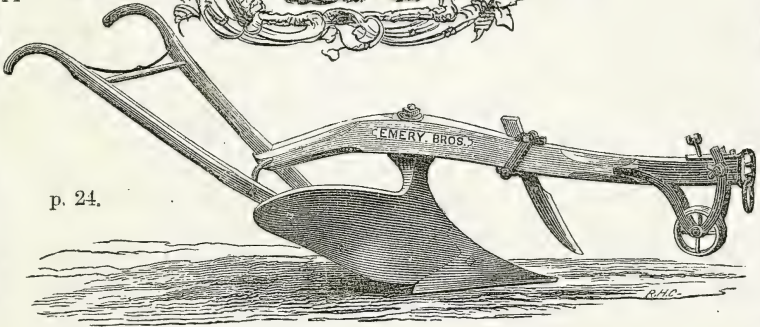
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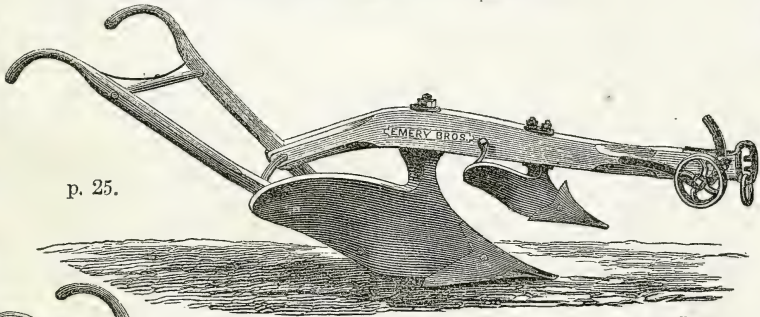
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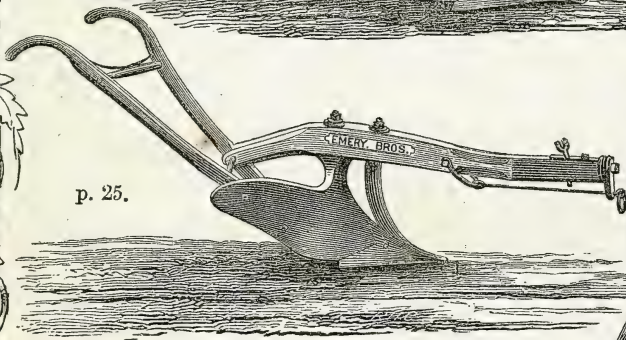
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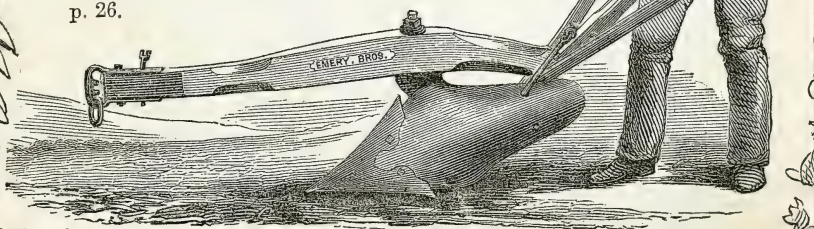
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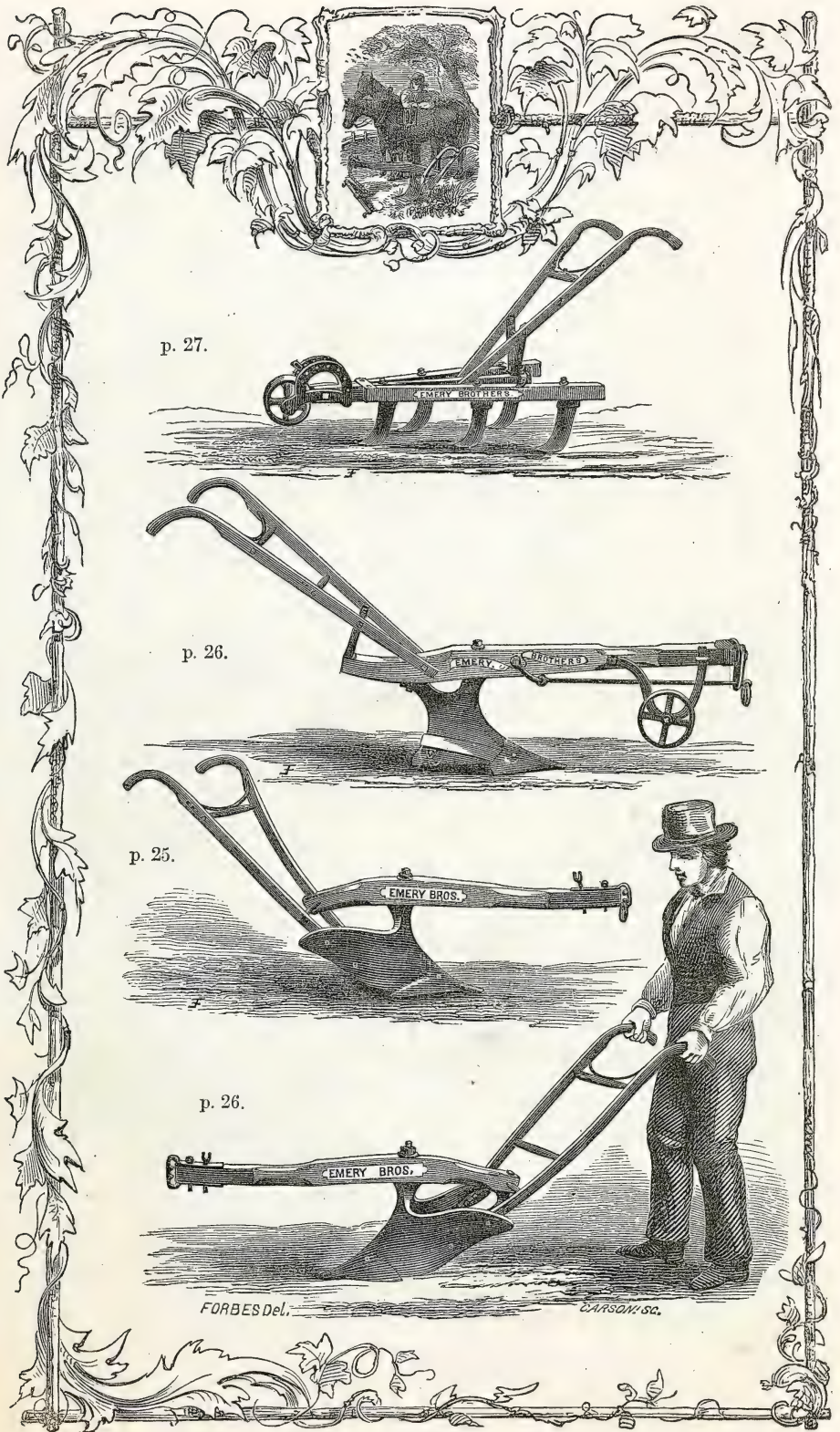


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EMERY'S PATENT
TWO-HORSE RAILROAD POWER,
IN OPERATION WITH THE
OVERSHOT THRESHER AND CLEANER COMBINED.

Plate I.

SECTION 1. The Proprietors having been for Twenty Years engaged in the manufacture and sale of Agricultural Implements and Machinery, and by traveling, exhibiting and attending Exhibitions, become familiar with the customs and necessities of the agricultural community throughout this country, as well as that of all parts of the world, new suggestions have continually presented themselves for improvements in many departments, and they have as constantly endeavored to Invent and Improve, as well as to Introduce, better Agricultural Machines, with what success it is needless here to enumerate.

§ 2. It is but just to say that of all the numerous inventions and improvements made by them, the application of the POWER OF HORSES, OXEN, &c., to the various purposes where heretofore only manual labor was considered available, has attracted and received much the greatest share of attention, and especially the so-called HORSE POWER on the ENDLESS CHAIN principle. This, as in the engraving, is operated by the gravity and travel of the Horses alone; and when once accustomed to them, no harness should ever be used.

§ 3. This Power having gained a world-wide reputation and introduction, it would seem almost useless to enter into detail of its construction, and in doing so only some of the prominent features which characterize it from all others will be referred to.

§ 4. Among the principal improvements over others before in use are the application of wheels of greater diameter, which generate the force and motion, and using connecting and multiplying cog wheels and shafts, by which an indefinite variety of forces and velocities of the band wheel may be obtained, while the travel and labor of the horses remain unchanged; and at the same time the several gears and shafts having a corresponding strength to each other, as the ratio of the squares of their several velocities require, thereby securing the greatest ease in working, greater durability, and at the same time adapting them to every possible want of the farmer, planter or mechanic.

§ 5. The perfect and at the same time simple adjustability of all the working parts of the HORSE POWER, by which the best possible results may be obtained at all times, without regard to amount of use or wear, is superior to that of any others ever made, as nearly ten years' constant and extensive use has demonstrated, not an instance being known where they have become useless and inefficient from any amount of wear of the several working parts.

§ 6. In this Power all the gearing is removed from under the horses, and inside the power to the outside, where it can at all times be seen and cared for, and readily attached or transposed for the various purposes for which it is to be used, as also from side to side of the Power, as is desired.

§ 7. All the several gear and band wheels are held firmly upon their shafts by means of strong coupling fittings and heavy screw nuts on the ends of the shafts themselves, similar to the nuts used to confine the wheel of a wagon to its axle, thereby avoiding the necessity of ever removing, changing or transposing the shafts themselves.

§ 8. All the small shafts which carry the links and small wheels of the endless platform are carefully turned to fit closely in them; and at the same time the fitting in the wheel being smaller than in the link, a shoulder is formed on the shafts, which allows the wheels to fit flush on the shafts, and no more, thereby insuring the exact position of the wheels on the tracks and the small shafts themselves, and at the same time allowing all the freedom requisite to the links and flooring planks, which are fitted into them loosely, and avoid any binding and friction of the links of the chain upon themselves, the shafts or wheels.

§ 9. The Powers also are the only ones provided with heavy cast iron flanged track throughout the entire circuit of the small wheels, both last features being of great utility.

§ 10. As these Horse Powers have gained an enviable position and reputation, they are very closely imitated by several other manufacturers, and offered to the public, and are not unfrequently represented as the genuine Power, which has in many instances had the intended effect to palm off a much inferior article. Again, by a cheaper cost of construction, and holding out greater inducements to dealers and agents, in the way of larger commissions, &c., than the profits of the genuine Power can afford, induce them to purchase the inferior and infringing machines, to sell to their unsuspecting customers. Therefore, in order to enable any person to distinguish the genuine Power, it is only necessary to examine if the letters or words "EMERY," or "EMERY'S PATENT," are in raised letters on the castings of the hubs of the band wheel, on the links and wheels of the endless chain and other castings; also if the small shafts of the chain have a smaller bearing in the wheels than in the links, with a shoulder for the wheels to run against; that the several gears and pulleys are confined by means of large nuts and screws on the ends of the main shafts, outside the said pulleys and gears; that all the four couplings of both main shafts, also of band and gear wheels, are uniform, admitting of all being transposed for different degrees of force and velocity, and from side to side, and *without removing the main shafts*, by simply removing their nuts; and that the cast iron flange tracks upon which the wheels travel are continued the whole length of their lower or return circuit.

Price of Two Horse Power and Pulley with extras for renewing same, \$120.

One do do do 90.

OVERSHOT THRESHING MACHINES, WITH CLEANER COMBINED.

Plate I.

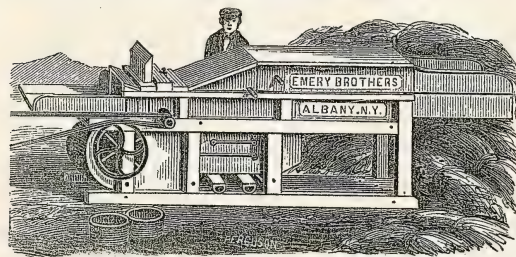
SECTION A11. The uniform success which has attended this machine at every and numerous fairs where exhibited, and an extensive introduction and sale during the past two harvests, has demonstrated its superiority over all its competitors as well as over all similar machines heretofore made by the proprietors, and entitles it to the following detailed notice.

§ A12. This machine combines all the advantages of the common Thresher with the over-shot cylinder, adjustable concave and changeable features, for left or right hand working, so long manufactured by the proprietors. It also has the journals of its cylinder hung in universal boxes or bearings, thereby always avoiding any binding and friction between them.

§ A13. This machine is furnished with a Fan, placed beneath the feeder's table, which is driven by an outside pulley, over which the main band passes and drives it in its circuit from the Horse-Power to the pulley of the threshing cylinder. A shoe, with screens and sieves, is also placed partly under and after the cylinder, and is similar to that in a common hand grain fanning mill, excepting the sieves and screens, which are all of an improved and peculiar construction.

§ A14. This frame work is extended some six feet in length aft the center of the cylinder, and is lined up its sides and covered over the top. Within this extended and enclosed portion of the frame are placed a light open wood riddle, filling the whole area, and with a closed wood riddle or bottom directly beneath it. Both riddles receive a vibratory motion endwise, but in contrary directions, so that while the upper riddle serves to separate the straw from the grain and carry it off at the extreme end, the tight riddles serve to convey rapidly and steadily the chaff and grain which has fallen upon it, back towards the cylinder, and discharging it directly upon the fingerboard of the shoe.

Among the most important improvements introduced by the proprietors in their machine, and which have given it its wide celebrity and its extensive use, are the following, which need but be known to be appreciated.



REVERSE SIDE OF MACHINE IN OPERATION.

and above the grain in the cells. This apron is placed immediately at the discharging side of the cylinder, and at an inclination upwards and nearly parallel with the inclined portion of the top of the machine as seen in the cut.

§ A16. It is well known that in all overshot machines the grain and straw are discharged at different angles, the grain taking a more downward direction, while the straw is carried higher and further from the machine, and if allowed so to do would strike the floor separately, and form almost a perfect separation in the operation.

§ A17. This endless apron is so placed in relation to the cylinder, as to avail itself of this described first and almost perfect separation of the grain and straw, making at a low estimate Ninety Per Cent of the entire separation at this point. The apron moving rapidly in the same direction with the grain, the concussion upon its slats is so slight as not to fracture the kernels of the most tender kinds of grain, and causes little or no wear upon the slats from the same cause. At the upper end of this apron, the grain from the cells falls directly upon the inner end of the closed riddle or bottom, by which it is conducted, with its chaff, to the shoe, as before described, while the straw is caught by a revolving beater with strong iron teeth, which teeth as it revolves are projected outward, and comb rapidly forward the straw, tossing and opening it for the free discharge of any grains which may remain in it. These teeth, on their circuit with the beater, recede within the beater at each revolution during the returning part of its circuit, thereby avoiding the possibility of clogging or winding of the straw upon it.

§ A18. Another feature is a series of wood fingers, lying within and upon the straw riddle; these fingers are about twenty inches long, and with each vibration of the riddle, are made to rise and fall several inches, thus virtually suspending the straw and agitating it at the same time. These fingers are very light, and move without noise, and require but a moiety of force for their action.

§ A19. The length of this machine, as shown by its frame work, is found sufficient for threshing and cleaning perfectly all heavy grains, but when light grains are to be threshed, and the work to be crowded, there is an extension which is attached if desired, and is shown attached in the cut. When not in use, or being transported, this extension may, with the sideboards and pulleys, which appear above the main frame, be detached and packed with-

§ A15. An endless apron of canvas, with hard wood slats extending crosswise the machine, which slats are about two inches wide, and two inches from centres and three-eighths of an inch thick, and confined edgewise to the endless apron, and with lugs at the ends, so as to form cells between the slats when moving in a plane, for receiving, holding and conveying the grain, while the straw and coarse chaff are suspended upon their edges

in the space inside the main frame, and the top, or cover, allowed to drop down upon the frame itself, thus making a compact and safe machine for transportation, while it is simple of adjustment for any person of ordinary capacity.

§ A20. The grain as it is threshed, is discharged by two spouts, one for the cleaned grain, and one for the tailings and partially cleaned grain—and, when ordered, an elevator for returning the tailings back to the riddles, &c., is attached, and for many kinds of grain is found a great labor-saving attachment, and requires also but a slight force to keep it in motion.

§ A21. Price of these Improved Machines, with a two-horse power and bands	\$250 00
Price of the Two-Horse Power Endless Chain	120 00
Price of Threshing Machine and Cleaner combined,	130 00
Price of set of Bands and Extras, (nett)	5 00
Price of Elevator for tailings (always an extra charge),	10 00

§ A22. All their Threshing Machines for two horses have the cylinders 14 inches diameter and 26 inches long; and for one horse 12 inches diameter and 26 inches long; where six or eight horses or steam and water power are used they are made 30 inches long and 14 inches diameter, and are constructed as follows:

§ A23. These CYLINDERS are all built upon a heavy cast steel shaft with solid cast iron plate heads, with hard maple wood staves, nearly three inches thick, forming the shell. These are turned off and enclosed with a substantial sheet iron covering, making it air tight and impervious to the atmosphere and moisture. The teeth, about sixty in number, are made of extra refined iron, with a sharp open screw cut on one end, nearly half their length, and are turned into holes in the cylinder, cutting their own screw thread in the wood, by which method they are confined more permanently, without any strain or torsion, than is the case when they are confined by screws and nuts inside, or by riveting, thereby removing all liability, of breaking and injury to operators or machines while in use.

The cylinders should be adjusted endways so as to prevent chafing against the frame, and with as little endways play on its journals as possible, and at the same time avoid friction and pinching against the boxes in which they run; these boxes when so adjusted to be firmly screwed to the frame. The teeth of the Cylinder should pass in the center of the spaces between the teeth of the Concave.

§ A24. The CONCAVE is of solid hard maple wood, containing about the same number of teeth. It is placed over the cylinder and so attached as to be adjustable in all ways.

It may be moved endways, if necessary, by simply loosening the two bolts which confine it to its iron end plates, by means of the slotted bolt holes in them. These plates at each end of the Concave extend down outside the frame, and are held in position by means of the open slots and bolts, which are also designed to facilitate the adjustment of the Concave to any desired position requisite to perform in different kinds and conditions of grain; by loosening these bolts at the side, the Concave may be raised at pleasure, for increasing its capacity for work, and also permitting either edge of the Concave to be raised or lowered more than the other, as for threshing tough and shrunk or damp grain, the edge furthest from the feeder should be lower than the edge nearest to him, which position causes the teeth of the Concave to present a more retaining angle, and consequently a longer hold upon the straw, enabling the teeth of the Cylinder to make perfectly clean work, while by lowering the edge nearest to the feeder more than the other, an opposite effect is produced, and which often, in dry easy threshing grain, nearly doubles the amount of work done per day. In adjusting this Concave the greatest care should be taken in order to cause it to hold on the straw sufficiently to do clean work, and nothing more, and it should be held firmly in position by the bolts at the side, at all times when in use.

§ A25. The feeding table is level and a little above the center of the cylinder, and the grain is fed in over the cylinder, thereby preventing any hard or injurious substance getting into the machine to endanger the teeth or the operators.

This Overshot construction, as it is called, has the advantage of delivering the straw and grain closely up to the machine, and at a sufficient elevation from the floor to admit of any variety of attachment for separating the straw from the grain, or attaching a cleaner, &c.

The driving pulley of the cylinder is fitted with a ratchet and hub coupling, which drives the cylinder in threshing and admits the pulley to stand still any moment when the horse power is stopped, the cylinder and its shaft running freely inside the pulley until its momentum has become expended, thus avoiding any stress upon, or flying off of the belts, or injury to the gearing of the power, and admitting of an easy and instantaneous stopping of the power by the brake. This is a valuable improvement over the old manner of confining the pulleys fast upon the cylinder shaft by set screws or keys.

The frame works are all made of the best ash and other hard wood. They are put together with joint bolts, and have base or sill timber into which the posts are framed and bolted, and the joints can at all times be kept tight in any climate or temperature.

CAPACITY, &c.

§ A27. The Two-Horse Power together with this Thresher and Cleaner combined, and with two horses weighing *one thousand pounds each*, and four men to attend them, will thresh, on an average through the threshing season, at the rate of fifteen to twenty bushels of Wheat or Rye per hour, and ten to twelve hours per day, of ordinary yield and quality. In extraordinary poor or great yield, or heavier or lighter horses, greater or smaller results will be realized: of Oats, Buckwheat, Barley, &c., nearly double the amount may be threshed.

THRESHER AND SEPARATOR.

§ 28. The other attachment for the Thresher is for separating the grain and chaff from the straw. *See Plate II.* The Thresher, when used with this attachment, threshes the grain, and simply separates the straw, and delivers it ready for stacking from the end of the separator, the grain and fine chaff falling through the openings upon the floor or ground, under the same. This grain or chaff is often removed by an attendant to an ordinary Fanning Mill, and cleaned at the same time, the Fan Mill being driven by hand, or by a band from the Horse Power.

The Separators are simply large wooden riddles, about three feet wide and ten feet long, with thin, light wood bottoms, perforated full of holes, about one inch diameter, made strong and light. When made for exportation or very changeable climates, with extremes of heat, moisture and dryness, perforated and corrugated sheet iron is used for the Separator bottoms, in place of the common thin, light wood, which would soon become rickety, and to pieces, with little use to the owners. They are suspended about two feet from the floor by means of two straps or chains at their corners next the Thresher, and to hooks for the purpose in the Thresher, as shown in *Plate II*; the other end being upon swing legs which stand upon the floor and connected to them by an iron rod running through them, and the end of the said Separator.

The Thresher, for this connection, has a shaft with a crank on it attached crosswise and under the feeder's table; the shaft extending outside and receiving a pulley which engages the horse power band precisely as in the case of the fan shaft and pulley, as described in section No. 20. From this crank a pitman extends midway under the Thresher, to the under side of the Separator, by which it is agitated and does its work better than three or four men could do it by hand by any other means. This crank and pulley is changeable to either side, to operate right or left handed.

Price of Thresher and Separator, with cylinder 14 x 30 inches,\$50 00

Price of Thresher and Separator, with cylinder 14 x 25 inches, 45 00

Price of Thresher and Separator, with cylinder 12 x 25 inches, 40 00

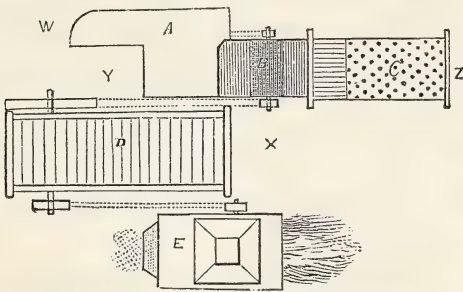
Sheet Iron Separators, two dollars extra.

WARRANTY, TERMS, CAPACITY, &c.

§ 29. The Two-Horse Power, with this Thresher and Vibrating Separator, will, with three or four men, thresh from one hundred and seventy-five to two hundred and twenty-five bushels of wheat or rye, and with one or two more men nearly double the amount of oats, barley and buckwheat may be threshed in ten hours as an average of good grain. With a good Fanning Mill, and a connection with the Horse Power by a band to drive it, and one man to attend it, the grain may be cleaned up at same time.

Price of Two-Horse Power with Thresher and Separator and Band together, \$170.

One do do 135.



- A feeder's table.
- B Thresher.
- C Vibrating Separator.
- D a One-Horse Power.
- E a fan mill, as often used.
- W assistant feeder.
- X attendant of Fan Mill.
- Y feeder of Thresher.
- Z person taking away straw.

The manner of belting the machines is shown in the vignette of reverse side of the Thresher and Separator, in the lower centre of the engraving on *Plate II*.

§ 31. It is sometimes desirable, on account of the position of the Horse Power and band, to have a guide pulley to keep the band steady and in constant contact with the iron pulley on the crank shaft of the thresher. This guide pulley is about eight inches diameter and three inches face, and runs upon a small, short shaft, which is fixed to a block of wood. This block is screwed to the side of the Thresher, and holds the pulley just over and in contact with the band. This guide pulley is indispensable with the Thresher and Cleaner, as it insures a perfect uniformity of force and motion to the Fan Mill and Shoe.

§ 32. As the whole of the working parts of the machinery of the One-Horse or narrow Power are in every respect duplicates of those in the Two-Horse Power, the same force is required to operate them as is required for the Two-Horse Power. Therefore, the effect of one horse, when used in either the wide or narrow Power, being precisely the same, it is desirable always to use the wide Power, whether for one or two horses, and for any kind of work. From long experience the problem is demonstrated, that when one horse alone is used, he will accomplish, say two hundred bushels threshing of oats per day of ten hours, while the addition of one horse in the wide power, without perceptibly increasing the friction, increases the amount of work at the ratio of five hundred bushels of same grain in same time, with simply the additional attendance of men to handle the grain and straw, and keep pace with the increased power of the second horse—an increase of 150 per cent.

PORTABILITY, ECONOMY, TRANSPORTATION, &c.

Among the many considerations in the invention, construction and perfection of the foregoing machinery has been their portability for safe transportation by various ways, as Railroads, Steamboats, sailing vessels, and by all kinds of land carriage.

§ 33. All machines from the **Albany Agricultural Works** are made with especial care in this particular, so that they may be readily taken apart for packing in the most condensed and safe manner, to bear handling and exposure without injury, by any of the ordinary modes of transportation; while all parts are so simple and plainly marked and numbered, that any person of ordinary capacity can without trouble or delay put them together. See **Plate III**.

For land transportation the Horse Powers are intended to be rigged upon axles and wheels and in a manner as shown in the engraving on the opposite page, forming a wagon of itself, into which may be loaded the threshers and all other parts appertaining to them.

The axle of the large wheels should be placed crosswise the Power, and over the projecting ends of the lower or sill timbers at the forward or gear end of the Horse Power, and firmly and permanently bolted to them. This axle may be made of any kind of hard, strong timber, say four by five inches square, and used edgewise. The ends of the axles to be fitted to any large wheels of a common farm wagon.

The forward axle should be of similar strength, and have a tongue or spire connected to it with eye bolts and braces, and fitted for the ordinary small wheels of a farm wagon.

A bolster for the Power should be made of tough, hard wood plank, about two inches thick and eight inches wide, and bolted permanently on the other end of the Power and to the under side of the projecting ends of the lower sill timbers. A large hole is made through the centre of this bolster for the draught bolt. As in this arrangement both the axle and bolster are straight, it is necessary to have a large, circular, wooden washer or rocker, made of a hard-wood plank, say twelve inches diameter and three inches in thickness, placed between the bolster and axle, the draught bolt passing through its centre.

The axle of the large wheels should be long enough to admit the gear and band wheels of the Horse Power to be attached and operated within the large wagon wheels, as shown.

This is much the cheapest, most convenient and desirable method of mounting a Horse Power for farmers and threshers' use and transportation.

§ 34. In setting the same in operation, the Power should be driven as nearly upon the spot where it is to stand as possible, and with jacks or levers allow the forward axle and wheels to be removed, and that end of the Power lowered, so that the bolster will rest upon the ground. Then take out the other machines and place them, put on the band, and all is ready for the horses to be put in and commence operations.

§ 35. When intended for distant transportation by railroad or on shipboard, the side boards of the Power are taken off and lashed strongly together, with their finished sides toward each other. The band and gear wheels are lashed to each other. The endless platform of the Horse Power, upon which the horses travel, is bolted down in its place, to prevent the wheels, links or flooring being lost or disarranged.

The Thresher is also contracted nearly one-half, by removing the feeding table and other projecting parts and confining them flatwise to the side of the Thresher itself. The Combined Thresher and Cleaner is also similarly packed, and contains all the beaters, bands, pulleys, riddles, sieves, grain spouts and extras, safe from injury from handling or exposure.

The vignettes in the lower centre and right and left corners of **Plate III**, represent the several machines packed for shipment, also being loaded on shipboard, &c.

§ 36. As the weight and cubic measurement of them govern the rates of transportation, they are given here as follows:

Two-Horse Power, without side boards,....	97 feet.	} 130 feet; weight, 1660 lbs.
Side boards for same,	26 "	
Band and gear wheel,	7 "	
Threshers (14 x 26 in. cylinder)	46 feet.	
Separators for same,	22 "	
Thresher and Cleaner, with straw carrier,	85 "	" 410 "
One-Horse Power, with side boards and wheels,	83 "	" 740 "
		" 1100 "

The One-Horse Power is mostly used for light work, and where it is necessary to be often removed to a new position, as in sawing wood at railway stations, and in the wood lot, among the trees and without roads, for the purpose of driving log cross-cut saw mills; also for mechanical purposes, where the room occupied is a great consideration; also for threshing grain among farmers with small crops, and small barns to operate them in.

§ 37. When it is consistent, it is always preferable to use the wide Power, as its cost is but fifteen to twenty per cent. more than the narrow. While it is preferable for one horse alone, its effective force with two horses is increased nearly one hundred and fifty per cent., as, by reference to section 32, it will be seen that with one horse alone one-third (or 33½ per cent.) of his power is absorbed in friction and generating the required velocity, while the ratio of power absorbed in working two horses together is but about 17 per cent. Again, the work is much easier for the team when two horses are used together, and no changing of team is required. Whenever an excess of force is generated by both horses, the Power should be lowered to a less angle of elevation, until their weight and travel just equal the resistance, or work being done, thereby making it still easier work for the team.

PORTABLE CROSS-CUT SAW MILL. FOR HORSE POWER.

Plate IV.

§ 38. Drag Cross-Cut Saw Mills, for cutting off logs for making staves, shingles, firewood, &c., &c., by horse power, are of recent invention. There have already been a great number variously constructed, and made by different persons, and with various success. Among the many inventions none are believed to be as well adapted for both the work and power as that illustrated in plate iv.

§ 39. It is constructed with a substantial wood frame about eight feet long, which is fastened down upon the ground when in use. Across one end of the frame is hung a substantial shaft, carrying a balance wheel and band pulley combined, outside of it, and weighing together about one hundred and fifty pounds. In the face of the wheel is fixed an adjustable wrist pin, which can give from twelve to thirty inches stroke. At the other end of the frame is attached a pair of iron ways and a crosshead, also carrying a wrist pin. A stiff wood connecting rod connects this crosshead with the wrist pin of the balance wheel..

The saw is attached to one end of a light stiff wood shaft, which passes between upright guides near to the log and extends and is attached to the connecting rod at a point between its crosshead and balance wheel; connections as shown in plate iv. This arrangement gives to the saw, when cutting, a rolling motion, and as the balance wheel turns over towards the log it raises the heel of the saw; in moving towards the log and lowering the heel it raises the point in the returning motion, enabling the saw to cut both ways and at a high velocity and avoids carrying bark, slivers, dirt, &c., into the kerf from either side of the logs, and without any increased liability of damage over the simple draw-cut machines.

§ 40. The log ways, truck and spiked roller are simple in arrangement and can be made by any wood mechanic. Those manufactured and sold with the machines are simply two good sill timbers, 4 by 5 inches square, twelve feet long, framed with cross girts with a spiked roller at one end and a four wheel truck, which traverses the length of the ways. The log is rolled upon the ways and one end lays across the spiked roller, near which the saw cuts. The truck is placed under the other end of the log, and by hooks or dogs, the log is fastened to it. The roller extends outside the ways with a capstan head, and the log is moved forward by means of a lever applied to the roller head. The truck travels forward with the log until it reaches the spike roller and the log is all cut up. The spike roller and truck are shown in the bottom corners of plate iv.

§ 41. Its capacity, with Emery's One Horse Power, is about hundred cuts three feet in diameter per day, and like amount of larger or smaller, logs of any kind of wood, and nearly double amount with two horse power.

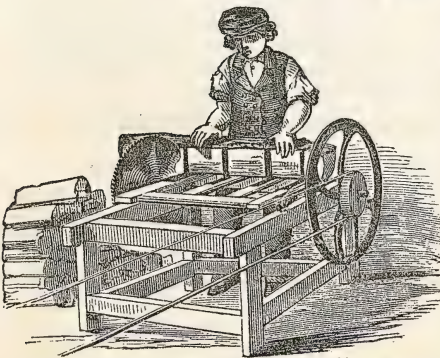
Measurement, about twenty-four feet. Weight of mill four hundred pounds, of ways, roller and truck, three hundred pounds additional.

Price of saw mill, with 5½ foot saw, without the roller, truck and ways,.....	\$40
Price of roller, truck and ways,	20

They are sold separately or together, as desired.

CIRCULAR CROSS-CUT SAW MILL. FOR POWER.

Plate IV.



§ 42. This is a simple, cheap and effective machine for sawing wood, shingles and any kind of work required by the farmer for fencing, or carpenters for slitting and cutting up lumber. With a 24 inch cross-cut saw, rigged as shown in the annexed cut and plate iv., it is used for sawing wood, and with three men and one horse will cut, twice in two, from ten to fifteen cords of cord-wood per day. With two horses all that five men can handle can be cut per day, and is universally used by railroad wood sawers. It has a heavy plate balance wheel (instead of spokes as in the cut) also a ratchet pulley for the belt. Measures 26 feet, weighs 350 pounds. Price, with 24 inch saw in working order and warranted, \$37.

§ 43. An attachment for slitting boards, &c., with 14 inch saw and table, extra \$7. A shingle saw attachment, with 24 inch shingle saw in working order, with slide table, guides, &c., complete to fit the mill, extra, \$40.

LEVER HORSE POWERS.

Plate V.

§ 45. The Lever Power is probably in more extensive use than that with the Endless Chain principle, when those in use in the whole country are considered. There are several reasons which have caused its wide introduction, and which still operate to a great extent to give it the preference in many sections.

Among them the first and most important is the necessity, in many portions of this and other grain-growing countries, of expedition in threshing out the crop. This expedition is caused, in some sections, by the necessity of long and slow transportation by water to market, between harvest and the closing of navigation by lakes, rivers and canals. Another is the want of barns and proper protection for unthreshed grain, as also the risk of wet weather and exposure in field threshing, dry weather being necessary for this operation.

The Proprietors have, therefore, from observation and trial, constructed a good Horse Power on the Lever principle, an engraving of which appears upon **Plate V.**

§ 46. As represented here, it is constructed with a large, horizontal, bevel master wheel, about five feet diameter, with teeth upon its under side, and revolving upon a substantial centre shaft, which is very permanently fixed to the bed sill timbers, and from which the tumbling shaft, with a bevel pinion upon one end, working into the master wheel, receives its force and motion. This shaft extends across the track of the horses, and has a large spur gear wheel upon its outer end. The sill timbers also extend the whole distance, and, being framed together, form a support to the shaft, and also to a head stock or frame for supporting a short counter shaft. This shaft is provided with a spur pinion at one end and a coupling and band wheel at the other. This pinion engaging with the large spur wheel before described, receives its force and motion therefrom, and imparts it through the band wheel to the threshing machine. The engraving **Plate V.**, with the foregoing description, give a full idea of its construction.

§ 47. This Horse Power is probably the most simple of any in use, and one of the most portable. As it is constructed, the force and motion are readily applied to any machine by a band or by a universal coupling and tumbling shaft, as the case may require.

§ 48. The Lever principle has the advantage over an Endless Chain Power in the fact of its admitting of from four to eight, or even twelve horses, whose united force exceeds anything yet made on the endless-chain principle.

A good sweep or Lever Power, with eight or ten horses, and ten to twelve men, will accomplish, with a good, large Thresher and Cleaner, about double the amount per day that the best two-horse Railroad Horse Power will average; and although the comparative cost per bushel of grain for threshing with the Lever Power far exceeds the cost with the Endless Chain, it is a matter of minor importance as compared with the saving in time effected in threshing out a large crop, under the disadvantageous circumstances of distance from market and risks of damage from the weather and exposure.

§ 49. Another advantage of the Lever Power over those of the Endless Chain is, that they can be used with light horses and mules, whose weight and travel upon the endless chain would not be sufficient to accomplish the desired amount of work, while the united force of the additional number of horses, by the use of Levers, would be sufficient to drive the machines up to produce satisfactory results.

§ 50. Whenever the amount of work which can be performed with the Endless Chain Power by two good horses, as represented in sections 25 and 29 of this work, will be satisfactory, it will be found, on investigation, the most economical in power, also in expense and convenience. It enables the farmer to do his work inside of his barn—to work in all weathers—to operate it with his own men and horses about his farm. Its first cost is much less—it is more readily and cheaply cared for or repaired when worn by use—is more portable and readily put in order and operated by any person about the farm or plantation. All these points have been considered, and there is no room for a mistake, while one more thing not mentioned is the fact that the farmer owning one of them can take advantages of markets and prices of his produce; and whilst only one team is required for the threshing, the others may be about other work on the farm, or on the road to market.

Price of Power, with Levers, \$125; weight, complete, about 1500 lbs.

MECHANICAL PRINCIPLES CONSIDERED AND COMPARED.

§ 51. In the Endless Chain the force of the horses is applied, through the endless chains and platform, to the reels in a tangential direction, or at right angles with the radius of the reels themselves—the horses walking in a straightforward direction, and not in an angular or sideways manner as with the Lever Power.

Again, the gearing is so arranged that it permits the team, whether horses, mules or oxen, to travel at their own natural gait, and generate the force and motion in a like ratio, without any draft or harness.

§ 52. All experience has shown that the required force or power to produce a given result, by horses, &c., is more easily obtained from their muscular action in traveling with their own gravity a given distance upon an ascending grade than by their direct draft as used with lever powers, as in the first case it is the result of the natural muscular conformation of the animal.

LEVER HORSE POWERS—continued.

§ 53. The principle of applying the muscular power of horses, by their draft upon a lever should be carefully investigated by every man having occasion to use horse power.

With the Lever (unlike the endless chain, which applies its force tangentially, or at right angles with the radius of the reels) the force of the horses is applied to the end of the lever, and at an acute angle, which angle is equal to that produced by a chord of an arc of so much of the circle described by the end of the lever as is required for the length of the horses and their trappings. This chord always being equal to the length of the horses, &c., its angle with the lever varies in proportion as its arc bears to the whole circle described by the end of the lever, and is more or less acute as the difference in the lengths of the levers.

§ 54. It will be admitted that whatever be the difference of the angle less than 90° , or than a right angle, just such a ratio of loss of power is the consequence; and inasmuch as a short lever produces a more acute angle of draft, the loss is more than with a long lever.

In order to demonstrate this problem diagrams would be desirable, but, without them, it will be sufficient for the purpose to state the results produced by the application of the power under the different angles of draft caused by the difference in the lengths of levers. In the following tabular arrangement, the length of levers is given, also the several angles in degrees, the length of lever which would be required, were the force applied tangentially to produce the same result, and the per cent of disadvantage or loss by the acute angular, over the tangent or right angular draft.

Lever, 14 ft.;	angle of draft, 65° ;	length required with right angle draft, 12.5 ft.;	loss of power, $9\frac{1}{2}$ per cent.
" 12 ft.	" 60°	" 10.4 ft.	" 15½ "
" 10 ft.	" 54°	" 8.0 ft.	" 25 "
" 8 ft.	" 42°	" 5.2 ft.	" 54 "

§ 55. Thus demonstrating why the endless chain is the most economical where its results in operation are satisfactory in amount.

It also explains why the results with eight and ten horses, and same number of men to attend, are scarcely ever equal twice that produced by the Endless Chain, with only two horses and four or five men.

§ 56. Although the Lever Power has the advantage of producing greater results, by employing more men and horses, than the Endless Chain Power can do, as now made, and as described in this circular, it will readily be seen that the ratio of increase in the expense of threshing with the Lever or Sweep is much greater than it is in the increase of results as compared with those of the Endless Chain. Annexed is a statement showing the relative expense and results of operating both kinds of machines. This is made from the actual average results, &c., so far as a very extensive experience has enabled the Proprietors to compute them.

EMERY'S PATENT ENDLESS-CHAIN HORSE POWERS, <i>Estimated for 10 hours.</i>	EMERY'S PATENT LEVER HORSE POWERS, <i>Estimated for 10 hours.</i>
Four men to attend, at \$1, .....\$4 00	Ten men to attend, at \$1, .....\$10 00
Two horses, at 50 cts., 1 00	Eight horses, at 50 cts., 4 00
Boarding men and horses, at $37\frac{1}{2}$ cts., 2 25	Boarding men and horses, at $37\frac{1}{2}$ cts., 6 75
Amount in bushels of wheat, 200, ....\$7 25	Amount in bushels of wheat, 300, ...\$20 75
Equal to over 3 cts. 6 mills per bushel.	Equal to over 6 cts. 9 mills per bushel.

This is supposing the farmer to own his own machine in both cases, and charging nothing for the use and wear of the same, which would, if reckoned, make the odds against the Lever Power. As it stands, it will be seen that the increased cost of threshing with the Lever Power over the other is ninety-two per cent.

§ 57. Should the calculation be made upon the supposition that the farmer hires his grain threshed by either machine, the relative cost to him will be about as follows:

WITH ENDLESS-CHAIN POWER.	WITH LEVER POWER.
Three of four men furnished by farmer, \$3 00	Eight of ten men required, .....\$8 00
Boarding four men and two horses, . . 2 25	Four horses of eight required, 2 00
Price of threshing 200 bush., at 5 cts., 10 00	Boarding ten men and eight horses, ... 6 75
	Price of threshing 300 bush., at 5 cts., 15 00
\$15 25	\$31 75
Equal to 7 cts. 6 mills per bushel.	Equal to 10 cts. 6 mills per bushel.

Making the difference forty per cent more with the Lever Power than the Endless Chain.

§ 58. Again, the conclusion is in favor of the Railroad Power, whenever and wherever the results of its use are sufficient to satisfy the demands of those using Horse Powers.

§ 59. Another advantage with the Two-Horse Power is that it enables the farmer to do his own work with his own men, and at any and all times to suit himself, the weather or the markets, and avoid the dreaded threshing time, with its regiment of cavalry, to say nothing of the waste of grain, the risk of damage by bad weather, the delay in waiting upon promises of others to do his work for him, the loss of time, the expense for men and boarding, &c., while waiting for repairs or on account of bad weather.

CLOVER SEED HULLER AND CLEANER.

Plate VI.

§ 60. There are perhaps fewer good machines for the purpose of separating the kernel of clover seed uninjured from its boll (or cell, as sometimes called), than for almost any other farming purpose. So great has been the difficulty as well as tediousness of the operation, with even the best machines for the purpose, until recent improvements, that farmers have been deterred from growing clover seed for market, and even have purchased their own seed from distant sections of the country, where water power has heretofore been considered indispensable for the process; it being the practice of farmers, for many miles around, to convey their clover chaff to such mills, and generally paying seventy-five cents to one dollar per bushel for having it milled, to say nothing of the time and expense of going to and from the mills with it, to which should be added the waste of all the chaff, which is carried off by the stream, instead of going into the manure heap, and often with great loss of seed in addition.

The operation of this machine upon the chaff is analogous to rubbing it between the palms of the hands, and consequently not dependent upon any special velocity of the cylinder. The effect of a higher velocity being simply to increase the amount of work. This machine works equally well with chaff which is damp and otherwise in an unfavorable condition, and which could not be worked by any other kind of huller in use.

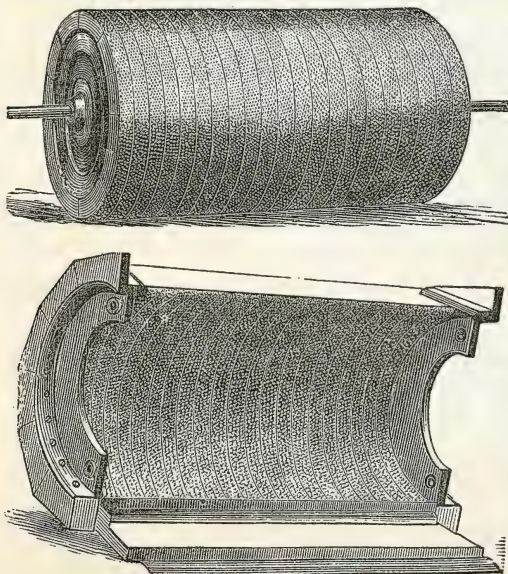
The advantage of cleaning the seed as it is hulled, is that the seedless chaff is blown away as fast as the seed is rubbed out of it, and only such portion of the chaff as may still contain seed is required to be run through a second time; while with without Cleaners the whole bulk of chaff must be run repeatedly through until all hulls are stripped from the seed.

This machine is claimed to be what every neighborhood as well as every large farmer should have, and will be the means of increasing the production of clover seed, as the cotton gin increased the culture of cotton.

§ 61. Its construction is similar to the Thresher and Cleaner Combined, as described in sections 11 to 24, except that instead of having spikes, as used in threshing grain, the cylinder is covered with bands of iron about one and a quarter inches wide by one-eighth inch thick, wound spirally over the whole surface, on which are raised innumerable teeth, resembling those of a coarse rasp; these teeth, although of iron, are tempered by a peculiar process, which renders them sufficiently hard to cut iron without dulling them, causing them to perform an almost indefinite amount of work before becoming unfit for use from wear; the surface only of the iron, to a moderate depth, being hardened, the teeth are not liable to be broken off, while, even after their points are worn off, the hard surface still preserves sharp edges to the teeth as long as any portion of them remain. Should they eventually become too much worn for use, a new set or covering can be put on at a moderate expense. The machine being over-shot, it prevents stones and injurious substances getting in to its injury.

§ 62. The annexed cut shows a cylinder as removed from the machine.

The concave incloses nearly one-half of the cylinder, and is placed above it, and is adjustable by means of set screws to any degree and nicety of distance from the cylinder. This concave is entirely lined with the same material and in the same manner as the covering of the cylinder, and is shown here as removed from machine. In the hopper is placed a small revolving picker, extending the whole length of the mouth, which serves to agitate the chaff in the hopper, and produce a constant and uniform feed to the machine. The shoe, sieves and screens are nearly all the same as in the Grain Thresher, section 21. This machine does equally good work at any velocity, be it ever so slow or fast, until too much, when it would break the seed by concussion. Its capacity, with one horse, is from five to fifteen bushels per day of cleaned seed, or nearly one acre per hour. The greater the velocity the



more it will perform. The machine cleans and screens the seed fit for market, but about one-eighth of the chaff and tailings require to be returned to the mill a second time. Cubic measurement, 50 feet, weight 500 lbs.

Price of Machine, complete, with Cleaner, as in Plate VI.,	\$100 00
Price of Machine, complete, except Cleaner Apparatus,	80 00

HAY AND COTTON PRESSES, FOR HORSE POWER. "BULLOCK'S PATENT."

Plate IX.

Progressive Lever Presses, with various modifications, and with one and two levers, have become the presses of the country.

§ 63. The illustration in **Plate IX**, is one of the most approved modifications.

The distinguishing characteristic of which is a "toggle joint," having one of its legs extended beyond the fulcrum, so as to be used as a lever to which the power may be applied by any convenient means to operate it.

This lever at one end is attached directly to the follower or weight to be raised as at **W**,

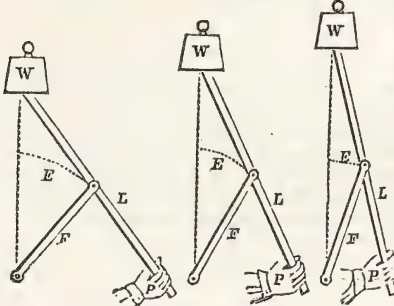


Fig. 1.

Fig. 2.

Fig. 3.

Fig 1; its fulcrum forms the centre of the toggle, as at **L**, Fig. 1, and is of course "movable" as the toggle changes position, and the part of the lever between this fulcrum **L**, and the follower **W**, Fig. 1, is virtually one leg of the toggle, which, in connection with the extension beyond the fulcrum the other way to **P**, Fig. 1, becomes the operating lever as before mentioned, forming a lever of the first class.

The lower leg of the toggle **F**, Fig. 1, being exactly equal in length to that part of the lever which extends from the fulcrum **L** to the follower **W**, their motions are similar and simultaneous, and consequently the lower or stationary end of leg **F** must be and is, at all times, precisely beneath the point of attachment of the other leg to the follower at **W**.

The upper end of leg **F** terminates at **L** and forms a movable fulcrum, which, in operation, produces the progressive power and moves the follower directly upwards without producing any side thrust at the point of connection with the follower or weight at **W**.

The movement of the follower or weight is shown by the perpendicular dotted line in Fig. 1; and that of the fulcrum **L** is shown by the curved dotted line **E**, Fig. 1.

The operation is shown in Fig. 2, with follower or weight partially raised. Fig. 3 shows still further progress of the levers and raising of the weight; the same letters referring to the same parts in each figure.

§ 64. This is the Feature and Gist of "BULLOCK'S PATENT," although often modified in many ways to suit different kinds of work and various forms of presses, it is still the same in principle, whether operated by a system of ropes and pulleys, or a segment of a wheel and pinion; and any press involving this principle, and not claiming to be made under "Bullock's Patent," or suppressing the knowledge of the same and called by any other name, is made, sold and used in violation of the Patent, and is a fraud against the proprietors of the same.

The Press represented in **Plate IX**, it will be observed, has two sets of these toggles and levers placed in position and parallel with each other, and are both operated in unison by the same power.

The upper ends are attached one at each end of and to the under side of the follower, for the purpose of securing a uniform level position of the follower, and preventing its being tilted by unequal pressure of material in the Press, upon different points of the follower.

This is by some considered a better way of governing the follower, than splines and grooves in the inside of the Press, as usually constructed when but one lever is used; although by duplicating the operating parts, the cost is considerably increased, and longer posts are required, making the Press of greater height and considerably heavier to move about.

There are others, however, who consider this method as being better, more in theory than in practice, and that the advantage is not always sufficient to warrant the increased cost.

It is for this reason that the patentee has not used this combination for many years, though he formerly made compressing Cotton Presses in this manner, some of which are and have been in use over ten years.

§ 65. Another method of controlling the follower while being forced upward by a single lever of the same kind, is to place at and under each corner of the follower a stout pinion, having a corresponding rack for each attached to the inside of the frame of the Press.

These pinions are connected together by two stout shafts on the under side of the follower, so that the two pinions on either side may revolve in unison; this mechanism insures both ends of the follower to be always at the same height, and thus prevents tilting as before.

The cost of this Press is about the same as that of the Double or Parallel Lever Press, and is doubtless equally good, and also includes as before the BULLOCK PATENT LEVER.

§ 66. There are many styles of the Single Lever Press without either of the above arrangements, which are so made as to operate in all respects fully equal to them, and have besides some advantages in their construction, strength and convenience, as well as in first cost.

Being of less weight, more simple in construction, having fewer working parts, they are not as often subject to mishaps, and are more easily and cheaply repaired and kept in order.

All of these presses are complete in themselves, can be used in the open field or in the barn, and may be easily transported from place to place, either on wagons or by being laid down and drawn on shoes upon the ground.

They are operated by a horse with a capstan and lever, requiring from five to eight revolutions of the capstan, or they may be operated manually by properly modifying the application of the power. They are made of different sizes.

§ 67. Prices, &c., of the Double or Parallel Lever Press, with Capstan, Levers, Sheaves and Rope, as in **Plate IX.**

Size.	Weight.	Height.	Size of Bales.	Weight of Bales.	Price.
No. 1,----	2500 pounds,	14 feet,-----	4 feet 2 in. by 24 x 30 in.,----	375 to 425 pounds,--	\$165 00
No. 2,----	2400 "	12 "-----	3 feet 10 in. by 22 x 28 in.,----	275 to 325 "	140 00
No. 3,----	2000 "	10 "-----	3 feet 10 in. by 20 x 28 in.,----	240 to 275 "	130 00

Full directions accompanying each Press.

The average capacity of these Presses, with three men and one horse, is about four to six bales per hour, according to the material to be pressed.

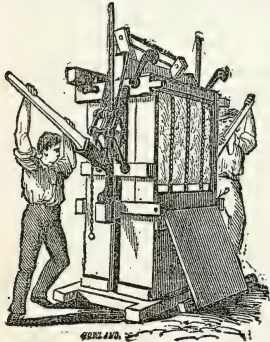
§ 68. Presses of equal capacity, with single levers, with capstan, ropes, &c., complete, are afforded at ten per cent less prices than the above; their own weight will be about ten to fifteen per cent less, otherwise about the same as to capacity, convenience, &c.

All presses taken apart and packed and small parts boxed when required for shipment, which saves nearly one-half cubic measurement; cost of packing, &c., \$2 to \$5 extra.

HAY AND COTTON PRESS, FOR HAND POWER. "Ingersoll's Patent"

For many purposes a hand working press is often more desirable than one designed to be operated by horse, as well because it is much cheaper as on account of its greater portability and the less room required to operate it in.

§ 69. This is extensively used by Farmers, Merchants and Manufacturers for pressing and packing hay, straw, cotton, husks, moss, hair, hemp, hops, hides, broom corn, rags, wool and tobacco, as well as numerous other articles requiring to be compressed.



In this machine the bales are pressed upwards as in the "Bullock's Patent;" the power is applied, however, at the sides of the Press instead of under the follower, thus allowing the follower to drop to the bottom when the Press is being filled.

By means of the hand levers and a swinging fulcrum, a clamp is worked up and down from one-eighth to one and a half inches at each stroke of the lever, according as they are worked at a high or low elevation.

A substantial timber extends through the Press under the movable bottom or follower, and far enough out at each side to receive a strong upright square iron shaft; these shafts pass through the clamps before mentioned, and at each stroke of the lever they are raised and bring up the bottom with them.

By means of a check clamp similar to the lifting ones, these iron shafts are held fast between each stroke of the levers.

By keeping the levers low and making shorter strokes, an immense force is exerted upon the bales. These are the lightest and best hand presses in use. The time occupied in working up the follower by two men, is from two to five minutes. The prices are as follows:

No. 1 will press from 150 to 200 pounds of Hay. Price \$60.
No. 2 will press from 250 to 300 pounds of Hay. Price 85.
No. 3 will press from 275 to 350 pounds of Hay. Price 135.

§ 70. Recent improvements in the common Cotton Presses, admit of the sacking to be put on the ends as well as the sides of the bale with the utmost convenience, and while it is under pressure, and little loss of time, thus avoiding the expense and inconvenience of framing with loose ends as heretofore done in all presses for the purpose.

§ 71. N. B. The Cotton Press suitable for pressing a bale of 500 pounds, 5 feet long, and 28 by 30 inches, and which is recommended for plantation use, is worth two hundred dollars.

This is framed with loose ends for convenience of sewing on the sacking.

With these Presses and the improved "Hoop Lock" and iron hoops, the planter can press and bind his cotton in packages, neat and permanent for shipping to any part of the world.

FANNING MILLS.

GRANT'S PATENT.

Plate VII.

§ 72. These Fan Mills, as shown in plate vii., are too well known throughout the world to require many remarks. It is sufficient to say that no mill approaches it in public estimation.

It is made by the veteran pioneer in fan-mill improvement in this country, and his motto has always been, "*make none but the best of its kind.*"

By means of improvements invented and patented by Mr. I. T. GRANT, this mill will chaff, clean and screen, fit for market, at one operation, wheat at the average rate of a bushel per minute, and separate grass seeds and refuse; also deliver each distinct by itself.

The Mills are made in the best style of modern manufacture and of the best materials, and warranted to operate to entire satisfaction.

§ 73. There are six sizes. The three largest sizes are fitted (when desired), with pullies to run by horse power, and often used in connection with the threshers and vibrating separator, described in Secs. 28 to 30—cleaning up the grain as fast as threshed.

§ 74. These Mills measure about forty cubic feet, and weigh about one hundred and fifty to two hundred pounds each.

For exportation or great transportation, they are readily taken apart, and six to eight mills can be packed and boxed up in the space occupied by one complete mill. Single mills can be boxed with nearly the same advantage. The item of boxing is extra.

The improved patented Mill has seven sieves and screens, and full directions for using.

Fanning Mills, Grant's Patent, No. 1, 18 in. Shoe,....	\$21;	with Pulley for Power,.....	\$22 00
Fanning Mills, Grant's Patent, No. 2, 20 in. Shoe,....	23;	with Pulley for Power,.....	24 00
Fanning Mills, Grant's Patent, No. 3, 22 in. Shoe,....	25;	with Pulley for Power,.....	26 00
Fanning Mills, Grant's Patent, No. 4, 24 in. Shoe,....	27;	with Pulley for Power,.....	28 00
Fanning Mills, Grant's Patent, No. 5, 26 in. Shoe,....	29;	with Pulley for Power,.....	30 00
Fanning Mills, Grant's Patent, No. 6, 28 in. Shoe,....	31;	with Pulley for Power,.....	32 00

§ 75. The same sizes of Mills, made in the same style and by the same makers, without the patented improvements, but in all other respects equal to any other mills made in this country, are sold for about 20 per cent less—of equal size, and have but five screens or sieves.

PORTABLE FARM MILL.

For Horse or Steam Power.

Plate VII.

§ 76. Many attempts have been made to produce a Portable Mill of moderate capacity and cost, so as to be within the reach of all those who have horse or other power with which to operate it, but among them all there are but a few that realize the desires of the inventors or purchasers, and that can be afforded at a price to warrant their purchase generally.

The Mill represented in plate vii. is considered the best for general purposes.

§ 77. It has a conical horizontal cylinder of white cast-iron, fluted lengthwise, with its lower half covered with a fluted concave, also of white iron, corresponding in form to the cylinder, while its upper half is covered by a cap or concave of cast-iron, and about one inch from the cylinder, and is furnished inside with a series of spiral or diagonal flanges, which have a vibrating motion when the Mill is in operation, and prevents clogging, and produces a current of air constantly through the Mill with the meal.

The hopper and shoe are similar to those of an ordinary grist-mill; the grain is fed through an opening in the cap to the smaller end of the conical cylinder, by which as it revolves, the grain is carried under the cylinder and in contact with the concave, partially grinding the grain, which as it is thrown up by the rising side of the cylinder, striking against the spiral flanges in the cap, and is thus thrown forward towards the larger end, when the cylinder again takes it under and reduces it to a finer state, and throws it up again against the next flange in the cap, and so on the whole length of the cylinder until it is discharged.

§ 78. It will be observed that the grain never passes around the cylinder more than once in the same place, and never stops on the way until it is discharged; thus no power is wasted by over-grinding, nor is the meal injured by heating while in the mill.

The concave is adjusted for coarse or fine grinding, by a thumb screw on the top of the mill.

§ 79. At the smaller end of the cylinder there is a cob-cracker, into which corn in the ear may be fed by hand through a separate hopper; this thoroughly cracks it, and delivers it to the grinding cylinder, where it is at once reduced to feed of any desired fineness.

§ 80. The Mill may be adjusted to grind all kinds of grain any required fineness for feed or household use, except for flour, and will grind with EMERY'S TWO-HORSE POWER, from four to eight bushels per hour, according to the kind of grain and fineness required.

The cylinder is self-sharpening, and will grind many thousands of bushels before the concave becomes too much worn for use, and that is easily replaced, at a cost of three dollars.

§ 81. It measures about twenty cubic feet. Price with hoppers, heavy balance-wheel and two pullies (one loose one), complete for use.

For two horse or more power, weight 400 pounds,.....	\$75
Large, for steam or water power, weight 500 pounds,.....	125

BURR STONE FLOURING MILLS, FOR HORSE OR OTHER POWER.

Plate VIII.

There is no material so well adapted for flouring purposes as the French Burr Stone, and it is now generally used in this country.

§ 82. Its first cost may be a little more, but the greater durability and efficiency very soon over-balance any difference in first cost.

Experience has shown that a Burr Stone should be as large in diameter as thirty or thirty-six inches to produce the greatest results, where the power to be used and the results are both considered, as larger and consequently heavier mills would require a greater proportion of a limited available force to propel them, and in fact would in many instances actually reduce the amount of work done.

These mills have been made with especial reference to their completeness in themselves, and their adaptation to a demand which requires them to be simple and easily managed, and at the same time suited to grinding all kinds of grain and feed for man and beast.

They are constructed so the running stone is hinged and balanced by a single point or cock head at the center, and yet the spindle runs upon two steel points at its extreme ends, in steps or sockets, which also form oil cups. (See plate viii.)

These stones are brought to their bearing by means of an iron beam passing under the lower end of the spindle, and another over the upper end, and connected together by a screw rod outside the frame, and which is regulated by a hand wheel upon it where it is convenient to the person in attendance.

The weight of the running stone is from four to six hundred pounds, and requires from three to four hundred revolutions per minute, at which speed and with less power they will accomplish as much work as is done with the four and five foot stones, and a greater proportionate amount with a more limited power.

§ 83. Weight of mills complete, are six to twelve hundred pounds, cubic measurement; when packed for shipment, about fifty to seventy-five feet.

Price, 36 inches, single geared, \$280 | 36 inches, double geared, price \$330.
30 " 250 | 30 " " " 300.

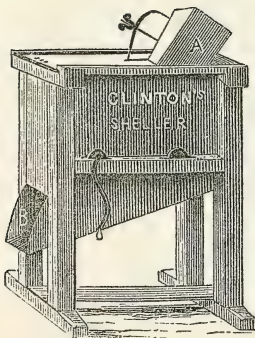
§ 84. Smaller Mills of Granite and Burr Stone furnished to order at the following prices:

24 inches, single geared, \$210; | 16 inches, single geared, \$125.
18 " 135; | 14 " 80.

Smut Mills of Grimes, also Smith's Patents furnished to order at manufacturers' prices. CORN and COB CRUSHERS, also BARK MILLS, for horse or other power of various and most approved kinds furnished to order, at manufacturers' prices.

§ 85. N. B.—All persons ordering Mills, should be careful to state which way they desire to have them run, whether with or against the sun, as they are made to run both ways.

CORN SHELLERS, FOR HAND POWER.



There is a great variety of Corn Shellers, including the various modifications of the old Pennock and Clinton Sheller, the most popular throughout the States for hand use.

§ 86. They are made some with one and others with two Hoppers; some are adapted for large and others for small ears of corn.

A good sheller, with single hopper, will shell corn as fast as the ears can be fed into it by hand, and is easily turned by one man, often shelling a bushel of ears per minute. The double Hopper Machine will do nearly twice as much, and turns but little harder.

Some of the hand shellers have separate delivery for the corn and cobs, while others do not; those, however, which separate, generally run heavier on account of the power consumed by retaining and carrying the cobs around between the shelling plates to the delivery after the corn is shelled, and are a little more likely to get out of order; they also require more care in feeding and cannot shell as much per day.

§ 87. Weight from eighty to one hundred and fifty pounds. Cubic measure six to eight feet. The prices vary according to size and kind.

No. 1, Clinton Sheller, one Balance Wheel,.....	\$7 00	No. 1, Clinton Sheller, two Balance Wheels,....	\$7 50
No. 2, Clinton Sheller, one Balance Wheel,.....	7 50	No. 2, Clinton Sheller, two Balance Wheels,....	8 00
With two Hoppers or Double Shellers,.....	11 00		

Southern and Western Shellers same as above, but intended for larger corn, \$1 each extra.

CORN STALK CUTTERS,

FOR

HAND OR HORSE POWER.

Plate VI.

§ 88. For corn stalks and coarse material, it has been found necessary to have an open cutting cylinder, and with independent flexible feeding rollers to accommodate themselves to the kind as well as quantity of stalks, &c., in the feeding hopper. (See plate, No. 00.)

§ 89. The knives of the most approved kind are attached to arms or heads which are fixed upon a shaft, and they are made with cylindrical and spirally formed cutting edges and nicely adjusted so their edges shall, in revolving pass in contact with a straight strong cast steel bed or dead knife, which is set permanently at the mouth of the hopper, and as the feeding rollers advance the stalks in the same ratio of velocity as that of the knives, the stalks are cut at all speeds of a uniform length.

This length is usually $\frac{3}{8}$ to $\frac{1}{2}$ inch with four knives, by taking off two of the knives double length, and if three knives be removed four times the length will be cut.

All machines of this class are constructed with pulleys for Horse Power as well as with cranks for hand use.

As this kind of work requires great strength as well as high velocity of the knives to accomplish much work, the cost of the machine is considerably greater than simple Hay Cutters for hand use.

These Machines, however, are very way well adapted for feeding both horses and other stock, as they can cut long or short, and for hay and straw as well as corn stalks, &c.

§ 90. A pair of grating cylinders is attached and furnished when desired similar to those used in a hand cider mill, between which the cut stalks pass and are at one and the same operation ground fine, making the hardest and coarsest material into the most palatable feed for any stock.

§ 91. Each Machine is furnished with a crank for hand use, and the iron balance wheel forms the band pulley and is upon the knife shaft, thus avoiding any gearing in cutting, and using the gearing only for the feeding roller—the whole cutting works are inclosed to avoid accident and prevent the cut feed from flying about, also delivering it through a spout into a basket if desired. No machine has given so general satisfaction.

§ 92. These machines are worth from thirty to thirty-five dollars, and with the grater attachment, ten dollars extra. Weight of machine, 250 to 300 pounds.

No other machine has been made which will accomplish anything near the same amount of work at less than fifty to sixty dollars, and none excel it now at any price.

CORN SHELLERS,

FOR

HORSE, STEAM OR WATER POWER.

Plate IX.

There is probably no better Power Sheller in use than the Horizontal Cylinder, as represented in plate.

§ 93. These Machines have recently been greatly improved in capacity, and by substituting wrought iron in place of cast, greater strength and lightness have been gained. Although before the improvement they were superior to any in market, they now defy competition.

It operates with astonishing rapidity, often shelling fifteen hundred bushels of shelled corn per day, of ten hours, with Emery's Two Horse Power, and shelling perfectly clean and separating the cobs without breaking them.

The ears are fed into the Hopper from a basket or shovel, as shown in the engraving, so as always to keep it full; the shelled corn falls under the Machine, while the cobs are discharged at the opposite end.

The aperture through which the cobs are discharged has a slide, by which it may be enlarged or contracted to increase or retard the passage of the cobs, so they may not escape until entirely clear of corn.

The shelling is performed by the action of a Cylinder about six feet long and one foot in diameter, armed with curved rows of short stout steel teeth, revolving rapidly in contact with the ears of corn, agitating them violently against each other and the iron concave, which incloses and confines the ears upon the rising and upper side of the Cylinder (without pinching them against a shelling bar or grate), quickly removing the corn to the last kernel without breaking the corn or tearing the cobs.

The rows of teeth are so formed upon the Cylinder that they, together with the weight of corn in the Hopper of the Machine, cause a continuous forward progress of the cobs towards the discharging end during the operation of shelling.

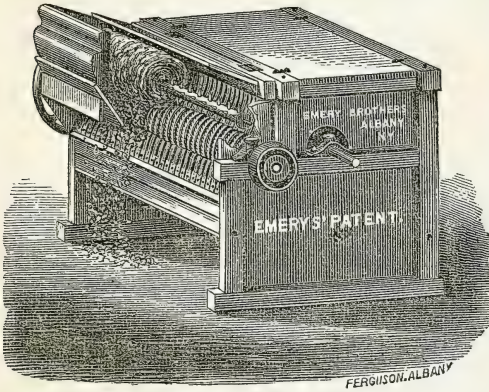
§ 94. The weight is from three hundred and fifty to five hundred pounds. Cubic measure about twenty-two feet. Price No. 1, \$100; No. 2, \$55.

IMPROVED COTTON GIN.

EMERYS' PATENT.

Plate V, No. 2.

§ A. The Cotton Gin is one of the most important among modern inventions and any improvements in it, or its operations, are, as they should be, eagerly sought for by the cotton producer. The enormous amount of cotton, and its great value, which is annually made in this country, causes even the smallest improvement in its manipulation to command a ready



adoption; and the numerous inventions and patents granted therefor since the introduction of Whitney's Saw Cotton Gin, go far to attest the great necessities and inducements for improvements. It is believed by the proprietors, who are familiar with previous efforts and patents, that their own improvements are among the most valuable since Whitney's time, and that they are chiefly in a different direction from that of nearly all other inventors, and which has been heretofore overlooked.

§ B. One of the best points in the improvement is its adaptability to all saw gins now in use, as well as those being manufactured by the proprietors, while it is both simply and cheaply applied.

§ C. The improvement consists chiefly of a cylindrical shaft of wood or other light material, so suspended within the hopper, upon its journals at both ends, as to occupy the hollow center within the cotton roll, which is produced by the centrifugal force of the revolving mass within the hopper.

This shaft is thickly studded throughout its surface with radially projecting pointed pins which become imbedded in the cotton, causing the shaft to revolve in unison with the roll by the force and motion which the cotton roll receives from the action of the saws upon it.

§ D. Its purposes and objects are to produce a uniform motion of the roll throughout its whole length and circumference, and to support the seed cotton and prevent that portion which is presented to the action of the saws from being compressed upon the saws by the weight of the cotton roll; also to avoid the consequent cutting and napping of the lint which would be caused thereby.

Its use produces a constant revolution of the roll positively relative to that of the saws, and preserves its cylindrical form, irrespective of the different and varying velocities of the saws, or the centrifugal force of the revolving mass in the hopper.



§ E. This shaft, with its pins, prevents all choking, clogging, bridging and breaking of the cotton roll from careless feeding or matted condition of the seed cotton, as the positive and forcible motion produced by the action of the saws upon that portion of the seed cotton roll lying between the saws and the shaft and communicated through it and its pins to the whole roll, is sufficient to overcome all such irregularities, and admits of the gin being worked up to the maximum power applied, be it more or less, without danger of stopping the operation of the gin or injuring the quality of the lint. It also enables the gin to be worked with almost any power, and at any velocity, and at the same time produces a uniform quality of lint; and increases the capacity for work in like proportion.

The proprietors also manufacture their attachment for the gin, which enables the whole to be operated upon the field, if desired, and without any lint room or gin house being required, also

for cleansing the lint from all dust and sand, delivering it at one and the same operation in fit condition for baling and the market. See Plate V, No. 2.

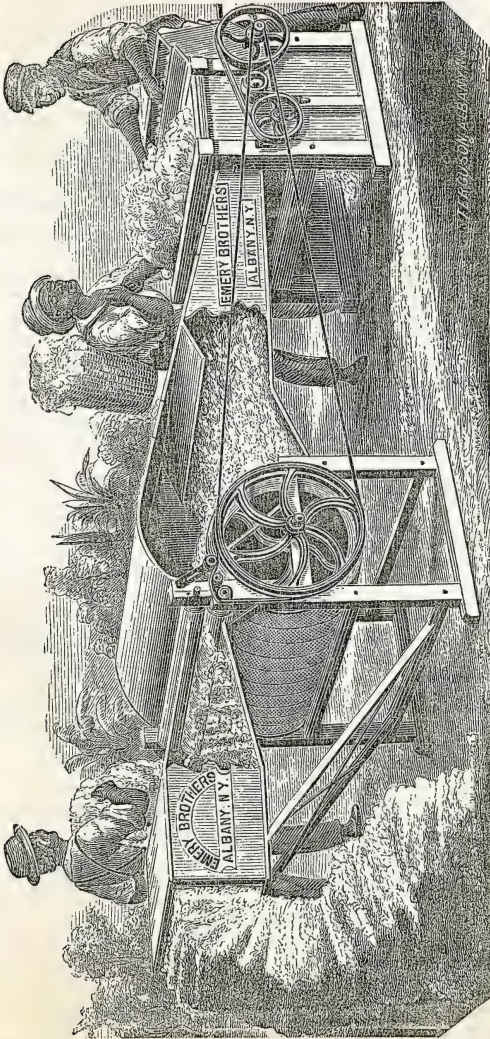
§ F. Price of Gin with 45 saws,	\$100 00
Price of Gin with 45 saws and with toothed cylinder,	110 00
Extra for each additional saw for larger Gins,	2 50

COTTON GIN WITH LINT CLEANER AND CONDENSER.

EMERY'S PATENT.

Plate V, No. 2.

§ G. The great necessity of cleaning the cotton from foreign matter either before or during the process of ginning, has caused inventors to produce a great many devices, some of which have met with a partial success, while much the greater number have never proved of any practical benefit.



The proprietors, after having become familiar with the wants of the cotton grower as well as with the numerous inventions for the purpose of separating the lint from the sand and dust which the seed cotton contains, have invented and successfully put in practical operation, such a machine as they believe will prove all they claim for it. Among all former inventions for the purpose, none seem to have contained a design for making this separation after the lint has escaped from the ginning process, but on the contrary they have had reference to the manipulating of the seed cotton during its being fed to the gin or while it was undergoing the ginning process within the gin itself.

§ H. This invention not only possesses the merit of producing a thorough separation of the lint and dust, but it delivers the cleaned lint in a very convenient and condensed condition, suitable for pressing and market.

This invention also has another importance, which is, that it can be operated equally well in the open field as the ordinary grain thresher or in a gin house or other buildings at the pleasure of the operator.

§ I. As represented in the cut annexed, this invention consists of an attachment to accompany any cotton gin, and consists of a trunk commencing at the discharging side of the gin and extending some six to ten feet, and opening at its outer end upon a revolving wire gauze cylinder; this trunk is closely fitted so as to conduct and discharge all the wind, lint, sand and dust upon the said gauze cylinder, the sand and dust passing through the gauze into the cylinder and escaping through its open ends and lower side, while the lint is all arrested upon the gauze cylinder.

§ J. As this cotton covered surface of the cylinder emerges at the upper side the lint is immediately removed from the gauze and passed into a con-

densing chamber by means of the lapping and impinging rollers, there placed, and without any loss or injury of the lint. This is probably the most simple as well as the most efficient and desirable arrangement for the purpose ever invented.

§ K. Every planter who has not, as well as those who have buildings suited for ginning cotton, will readily appreciate the value of the Cotton Cleaner and Condenser, but especially will those appreciate it, who, for want of facilities of their own, have transported their seed cotton long distances for ginning and paid in toll or otherwise from one-fourth to one-third the quantity or value for ginning the balance.

These are adapted to any gin but especially those manufactured by the proprietors.

§ L Prices of the Lint Cleaner and Condenser for Gin with 45 saws, . . .	\$90 00
Additional for larger sizes for each additional saw,	1 00
Price of Gin with 45 saws,	100 00
Price of Gin with 45 saws and with toothed cylinder,	110 00
Extra for each additional saw for large Gin,	2 50

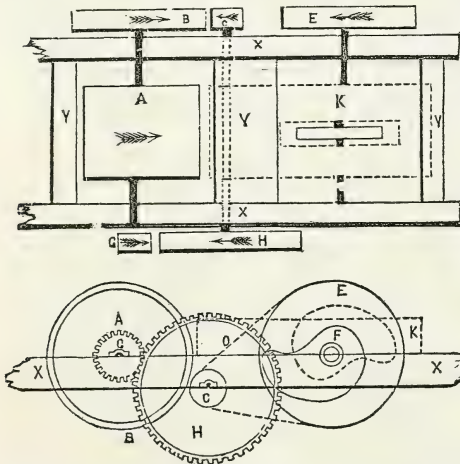
EMERY'S PATENT PORTABLE CIDER AND WINE MILL AND PRESS. PLATE X.

These descriptions and diagrams represent the latest improved Mill and Press in use. It has been extensively and successfully introduced for three years past, and such improvements as experience has suggested have from time to time been adopted, making it, without question, the most complete mill in all its parts and operations, having no equal.

§ 95. The apples are reduced to a fine pulp by a cylinder grater, which is propelled by hand power, or by a band from any other power, as horse, steam or water. The apples are fed up to the cylinder by means of a plunger or piston, which traverses to and from the cylinder in the bottom of the hopper, moving steadily and with even force the apples, whether hard, soft, large or small, and avoiding all possibility of choking, clogging or unevenness in fineness of the pulp. This plunger is moved forward by an iron cam, propelled by a band from the driving shaft of the mill; the plunger recedes from the cylinder by a simple wood spring, advancing nine-tenths of all the time, and requiring but one-tenth to return to its starting position to receive another charge of apples.

The feeding force being produced by band connection, all accidents to mill or person from getting foreign, hard or injurious substances into the mill are avoided, as the band will yield and slip on its pulleys sufficiently to avoid injury, whereas all gear feeding mills must be damaged by such occurrences.

§ 96. The Press is of more importance than the other parts. As from all experience in presses, it is satisfactorily established that where the pressure is applied upon a single point of the follower a very large percentage of the power applied is required to overcome friction, torsion, &c., which is produced by the tendency of the follower to tip or tilt by the unequal and changing resistance of the pulp in the hoop, besides a great loss of time consumed in frequently leveling the follower. To obviate these difficulties, this Press is provided with three parallel screws, so positioned as to apply the force with uniform motion upon three points equally distant from the centre of follower and each other. The screws are forced down simultaneously by the nuts being revolved by teeth in their edges, acted upon by a central pinion, which is turned by a lever.



[The same letters refer to the same parts in each diagram.]

- A grating cylinder, about 11 inches in diameter.
- B band pulley and fly wheel of cylinder A.
- C small pulley on crank shaft which drives pulley E by a small band.
- E large pulley driven by C, moving cam F.
- F cam for driving piston K, in bottom of hopper.
- G small speed gear for driving it by hand.
- H large gear wheel to drive cylinder.
- K piston, shown by dotted lines, operated by cam F.
- O band connecting feed pulleys C and E.
- X X top girts or supporting plates of mill.
- Y Y Y cross girts of frame-work.

§ 97. The Mill is provided with a tank to receive the apples as they are ground for a barrel of cider. The Mill, when worked by two men, can grind and press from 6 to 8 barrels per day, and when the grinding is done by power, nearly double that amount can be done. Less than the force of one horse in the Power is needed to grind 50 bushels per hour.

The Press is equally well adapted for wine, cheese, lard, pressing clothes, &c.

Price, \$50; weight, about 400 lbs.

For making cider with high color and flavor, it is necessary to grind the apples twelve to thirty-six hours before pressing, and to subject the pomace to as much surface exposure as possible, in broad shallow vats, frequently stirring it to bring the mass to the surface.

The affinity of the pomace for oxygen causes it to absorb it rapidly from the atmosphere, the chemical effect of which is to give both flavor and color.

For vinegar, the atmospheric exposure of the pomace for a greater length of time accelerates the chemical action, and produces vinegar of the best quality.

Very good vinegar can be made from a second pressing, by leaving the pomace about three quarters pressed, and spreading it open to the air and frequently stirring it, with the addition of about the same amount of water as there is juice remaining in the same, the water to be added by sprinkling it upon the pomace as it is being stirred over. Caution should be used to prevent the mass becoming too much heated by the chemical action in this process.

HAY AND STRAW CUTTERS, FOR HAND POWER.

Plate XII.

§ 98. There are as many kinds of Cutting Machines as material to be cut, and while a few are equally well adapted for all kinds of material, the greater proportion are adapted to cutting one or two varieties only.

The Hand Machines generally approved and most extensively in use, are made with a strong iron cylinder, with radial knives cutting by pressure against another cylinder formed of dry raw hide, the material to be cut being fed in between these cylinders by their combined action in the process of cutting. The knife cylinder having a crank and balance wheel attached to it for hand use.

§ 99. For cutting one inch long, eight or ten knives, and for longer or shorter cut, more or less knives are used; each machine, however, is made for its set of knives and not changeable.

Some of them have the knives straight, but set a little diagonally with their axis, while others have their knives twisted, so as to stand spirally upon the shaft, and all points of each knife radiating from the center of the axis—this is probably the strongest form of the two for a knife of equal size, and smoothest in its operation.

§ 100. There is a great variety of them with from four to twelve blades, and from six to thirteen inches long; also for hand or with a pulley for horse power, and capable of cutting from two hundred to two thousand pounds of hay and straw per hour.

For hand use, those with eight blades, cutting one to one and one half-inches long are generally preferred for horse feed, which is deemed as short as should be fed to them, in order to cause them to properly masticate their food, for they do not "*chew their cud.*"

§ 101. For cutting corn stalks and very coarse fodder, this kind of machine is not as well adapted, and for the cutting of such material, hand labor is not sufficient or profitable.

These machines would not cut stalks as short as desirable even with twelve knives—while the space between them would be insufficient to admit the cut stalks to pass, and as their radiating angle would be but thirty degrees, they would retain what they could admit without discharging it, thus choking and stopping its action, and on this account are only adapted to hay, straw and fine material, which will freely discharge from the knives.

They are however the most rapid, simple and durable as well as cheapest kind of machines for the use to which they are adapted.

NEW SERIES. ADJUSTABLE SPIRAL KNIFE HAY CUTTER.				OLD SERIES. SPIRAL AND STRAIGHT KNIFE HAY CUTTER.			
Sizes.	Length of Blades and Cylinders.	Length of straw cut.	Prices at retail.	Sizes.	Length of Blades and Cylinders.	Length of straw cut.	Prices at retail.
No. 0,---	5½ inches,---	1¼ inches,---	\$6 50	No. 1,---	5½ inches,---	1¼ inches,---	\$8 00
" 5,---	5½ "---	1 "-----	7 00	" 2,---	5½ "-----	1½ "-----	9 00
" 10,---	5½ "-----	1½ "-----	7 50	" 3,---	6½ "-----	1½ "-----	10 00
" 15,---	5½ "-----	1 "-----	8 00	" 4,---	6½ "-----	1½ "-----	11 00
" 20,---	6½ "-----	1½ "-----	8 50	" 5,---	6½ "-----	1 "-----	12 00
" 25,---	6½ "-----	1 "-----	9 50	" 6,---	7½ "-----	1½ "-----	14 00
" 30,---	7½ "-----	1½ "-----	10 50	" 7,---	7½ "-----	1½ "-----	15 00
" 35,---	7½ "-----	1 "-----	11 50	" 8,---	7½ "-----	1 "-----	16 00
" 40,---	8½ "-----	1½ "-----	13 00	" 9,---	8½ "-----	1½ "-----	17 00
" 45,---	8½ "-----	1 "-----	14 00	" 10,---	8½ "-----	1½ "-----	18 00
" 50,---	9½ "-----	1½ "-----	16 00	" 11,---	8½ "-----	1 "-----	19 00
" 55,---	9½ "-----	1 "-----	18 00	" 12,---	9½ "-----	1½ "-----	22 00
" 60,---	10½ "-----	1½ "-----	20 00	" 13,---	9½ "-----	1½ "-----	24 00
" 65,---	10½ "-----	1 "-----	22 00	" 14,---	9½ "-----	1½ "-----	26 00

Nos. 50, 55, 60 and 65 fitted for horse power.

Nos. 12, 13 and 14 are fitted for horse power.

IRON GARDEN AND LAWN ROLLERS.

Plate IX.

§ 102. These are constructed the same as the Field Rollers, with the difference that they have a tongue and handles for being drawn by hand, and without a box to carry weight.

The tongue is forked, and connected with each end of the shaft by means of square fittings, and weights or counter balances are fixed upon the shaft within each section; these are keyed to the shaft so their heavy part is opposite the tongue and counterbalance it, and always causing the handles to incline upward without any effort of the operators.

SIZES AND PRICES.

§ 103. Garden Roller (7½ in. section), 15 in. diameter, 2 sections,.....	\$6 50
\$1.50 extra for each additional section.	
Garden Roller (12 in. section) 20 in. diameter, 1 section,.....	9 00
\$4 extra for each additional section.	
Garden Roller (20 in. section), 20 in. diameter, 1 section,.....	14 00
Garden Roller (12 in. section), 24 in. diameter 2 sections,.....	18 00
Garden Roller (12 in. section), 28 in. diameter, 2 sections,.....	20 00

GEDDES' HARROW,

OR

DOUBLE A HINGED HARROW.

Plate XIII.

This harrow is the best adapted for hard use in new and rough land where stumps, roots and fast rocks abound.

It is heavy and strong, both in materials and form of construction. The A form prevents hanging by their timbers to any fast obstructions. The double A form admits of their teeth being so widely distributed as to prevent the possibility of any two of them holding upon the same stones, or other obstructions, and carrying them along, and causes them to track in uniformly parallel lines over the ground.

§ 109. They are constructed in two parts and connected together by hinges lengthwise at the center, by which they conform always to the undulations of the ground. The person attending its use can also readily raise either half from the ground to allow it to pass, or to free it from immovable obstructions.

In transporting and loading them into carts and wagons, they are always folded back to back.

The teeth are square, heavy and long, and driven into the beams, from the under side, with a square tapering shank, which is rounded, and a screw and nut on the upper side of the beam, by which means they are always kept tight, while they may be readily removed to present their different corners to the work as they wear dull.

§ 110. There are several sizes and prices, as follows:

14 teeth, $\frac{3}{4}$ inch square, for one horse.....	\$8 00
18 teeth, $\frac{1}{2}$ inch square, small two horse.....	10 00
22 teeth, $\frac{1}{2}$ inch square for two horses,	12 00
26 teeth, $\frac{3}{4}$ inch square, large two horse.....	13 00
30 teeth, 1 inch square, heavy two horse,	15 00

SCOTCH OR DOUBLE SQUARE HARROW.

Plate XIII.

§ 111. These are chiefly used for broken land and for putting in seed of grain and grass. They are made light and broad, with a large number of teeth, and do their work thoroughly, and produce a fine and even surface to the soil, well calculated for seeding down for grass and hay purposes. They are made in two separate harrows, hinged together, and drawn by a separate clevis to each, by which they are connected to an evenor or yoke. Each harrow has four beams, each two and a half inches square and five feet long, of good white oak timber, framed together with cross beams in an angular or diamond form. The forward end of each timber is set at such an angle with the cross beams as to range with the hind end of the next beam to it. Each beam has five teeth equally distant from each other, and the forward tooth in one beam ranges the same distance from the hind tooth in the next beam, as the several teeth in each beam range from each other.

§ 112. The two harrows are connected by hinges the same distance from each other as between the beams themselves, which causes all the teeth in both harrows to track at even distances from each other. By means of the adjustable clevis attachment, the harrow may be drawn at different angles, varying considerably in width as well as fineness of the tracking of the teeth. The teeth are made quite long, of $\frac{3}{4}$ inch square, iron, forged with a slight taper, and set in the beams with the grain of the wood, which allows them to be driven tightly without splitting the beams.

The teeth thus set, operate always with a corner forward, and as often as worn dull may be driven out and turned, so as to bring another and sharp corner to the work. When new, the teeth are driven but half way through, and are afterwards driven as they wear away. They are of the best of iron, and hammer-hardened, which is next best to steel laid points.

§ 113. They are furnished with clevis connections, and evenor at the following prices:

40 teeth, with steel laid points.....	\$11 00
40 teeth, with hammer hardened points.....	10 00

EXPANDING & REVERSABLE HARROWS.

§ 114. This harrow is constructed with four or five parallel beams for the teeth, (which are the same as used in Geddes' Harrow), and two cross-beams upon the top and at the ends of the others, and constructed so as to admit of its taking any form as square or diamond. It is drawn by either of the four corners, which may be square, acute or obtuse, according to the work to be done. When it is drawn by an acute corner, it tracks narrower, and the teeth are closer to each other and makes finer work; when drawn by an obtuse corner, the opposite effect is produced, tracking wider and doing coarser work. Prices and sizes as follows:

22 teeth, $\frac{1}{2}$ inch square, light two-horse,	\$9 00	25 teeth, $\frac{1}{2}$ inch square, two horses,	\$10 00
20 teeth, $\frac{3}{4}$ inch square, two horses,	10 00	23 teeth, $\frac{3}{4}$ inch square, heavy two horses, ...	11 00

EMERY'S SEED PLANTERS.

Plate XIII.

ALBANY CORN AND SEED PLANTER.

§ 115. Also known as Emery's Corn Planter—for hand or horse power, and adapted for all kinds of seeds, large or small, heavy or light, and any amount to the hill, drill or acre. It is also equally well adapted for hills or drills. This is shown in the foreground in the engraved group of Planters in **Plate XIII**. This has been in use nearly twelve years, and has been the most successful of all machines for the purpose intended—working equally well with all kinds of seeds and soils. It has gained a world-wide reputation, and enjoys a constantly increasing demand; and, notwithstanding the scores of more recent inventions, and many times more effort made to introduce them, this Albany Planter still maintains its supremacy.

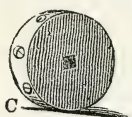


Fig. 1.

It has a wooden cylinder fitted inside the seed hopper, when corn and like seeds are to be planted, as seen in fig. 1. This cylinder has a series of cells or cups in its surface, which are adjustable to any amount or size of the seeds, or can be arranged so that only a portion of the cups shall receive seeds, while the others take none at all.

This cylinder receives a motion by means of its shaft and gear wheels and connection with the large forward ground wheel. The disc of this large wheel having several rows of cogs, it can be made to give any variety of motion required to the cylinder, for planting various seeds, in different quantities and distances apart. With all the cells open, and the highest motion of the gears, it will drop once for every three or four inches, or equivalent to drill planting; while by shutting off a portion of the cells, and a slower motion, any desired distance may be obtained, to eight feet between the hills. It has a plow adjustable to any depth, and a coverer which scrapes the requisite amount of earth over the seed, and a compressing roller following, finishes the work at one operation. By lashing a wooden rod crosswise the frame, nearly over the plow, and attaching one end of a trace chain to it, at each side of the planter, and the width apart desired for the rows, the machine will mark off its rows as it works through the field, as while one chain drags in the mark last made, the other makes a new mark as it drags over the earth, thus planting exactly between the marks and always parallel. From six to ten acres per day can be planted with one man and a horse, with rows three and a half feet apart. When used without a horse, not so much can be done.

For Small Seeds and Drill Sowing.



Fig. 2.

§ 116. Many seeds which are of variable forms and gravity, as well as the most difficult to sow by hand, require the most care in sowing, as to quantity, distribution and depth, a machine, therefore, to operate well in all these variations, cannot depend upon the gravity of the seeds or size of the cells, as in the cylinder before described, but has a circular brush fixed upon the spindle inside the hopper, in place of the cylinder, and which receives the same motions from the gearing—the brush is shown in fig. 2.

There is also a series of metallic slides to fit and form the bottom of the hopper, each slide having holes of different diameters, through which the seed is forced by the action of the brush inside—the quantity of the seed depending upon the size of the hole in the slide, which is in the hopper. The Planter makes its furrow, deposits with unerring accuracy the requisite amount of seed into it, and the roller follows and finishes the operation.

Several other parties, here and elsewhere, have made patterns from this Planter, and made and sold planters, representing them to be the same, none of which are so made as to do the work as well or uniformly, and few, if any of them, have been made so as to avoid breaking and grinding the seed, or retaining more or less in the cells, and dropping irregularly. Price \$14.

GARDEN DRILL AND PLANTER.

§ 117. For all kinds of seeds, large and small, for garden use. This is shown on the right hand of the group in **Plate XIII**. This two-handed Garden Drill is calculated for small and light seeds, has the circular brush and sliding metallic plates, same as the simple drill, and as used in the Planter last described. It also has a wooden cylinder, with adjustable cells, for sowing large and heavy seeds like peas, beans, &c. This cylinder can be instantly substituted for the brush, and *vice versa*. This is only adapted for drills, although capable of operating with all kinds and quantities of seed. It covers the seed and rolls the ground at the same time. Price \$6.

SEED DRILL.

§ 118. Intended only for small seeds and for drill sowing. This is seen on the left of the group, **Plate XIII**. This one-handed Seed Drill is a light, simple machine, and adapted to drilling small and light seeds only. The axle passes through the lower portion of the hopper, and turns with the wheel, giving motion to the brush inside, and it is provided with the series of metallic slides, as in the other machines. Price \$3.

DOUBLE HILL HAND CORN PLANTER.

Plate XIII.

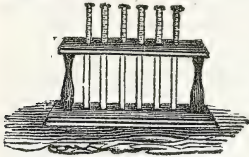
§ 119. For planting two rows at a time by hand, in hills. The operator walks through the field, as with two walking canes, one in each hand, planting each time he sets them in the earth. This is the last of the group seen in the hands of the farmer, in the act of using it, **Plate XIII.** Is a modern invention, and consists of two complete planters, which may be used singly or connected together by their upper ends, and as shown in the hands of the farmer in the engraving. Each of them consists of a light wood box about as long as a walking cane, and will contain about three quarts of corn, and is provided with a D handle, by which it is carried and operated—the lower end is flat and sharp, and pointed with two flat spring steel plates, and enters the ground like a chisel. Inside the box is a slide-valve and a piston, both of which are moved by a side motion of the D handle, to which they are connected. It is operated by setting the point where the hill is to be, and pressing directly on the D handle, when the points enter to a proper depth, and with a slight sideways motion of the same handle, the seed is measured off, and forced into the ground by the piston to the bottom, thereby depositing the seed at an even depth, and as the point is withdrawn the earth closes over the seed. A man can operate two at once, as well as one, by setting the points at proper distance for width of rows, and he can plant as often as he will swing a scythe in mowing grass. Price, single, \$3.50; double, \$6.00.

desire, and each machine is of the most approved kind in use.

This assortment of Planters and Seed Sowers comprises all the farmer and gardener can

LACTOMETER.

§ 120. The first thing requisite for a dairyman is a Lactometer, see fig. 1, for the purpose of ascertaining the consistence or qualities of the milk of each cow in the herd, and those best adapted for making butter, cheese or beef. This is a simple frame with six glass tubes, each graduated to inches and decimals of an inch, the highest mark being twelve inches from the bottom, and so on down to eight inches. The manner of using it is to fill each tube to ten inches with the new milk of a different cow, and allow it to stand in a proper place for all the cream to rise, when on examination, by holding the frame to the light, a distinct line will be seen between the cream and the milk, and the color and quality of the milk itself be ascertained. If the cream of one cow shall show fifteen degrees (or fifteen per cent, of cream), and the milk eighty-five degrees (or eighty-five per cent) while another tube indicates but half the amount of cream and the relative difference in the milk, it is positive evidence which cow is best for butter and which for beef or cheese. This instrument is worth its price (\$3.00) in the selection of each cow for a dairy, and no wise farmer will do without, and one is sufficient for a whole neighborhood.



§ 121. The next thing is a good thermometer, worth fifty cents, to aid in keeping the dairy room at the proper temperature, as well as to know when the cream itself is of the proper temperature to be made into butter, before being submitted to the process of churning.

§ 122. From the most extensive experience and numerous experiments, as well as the repeated microscopic analyses of the cream and milk, before and during the process, and the butter itself after churning, the proprietors are satisfied that only a mechanical process is required, and that process which best serves to bring the minute particles in contact with each other by compressing them sufficiently to expel the milk or fluid from between them, will yield the quickest, as well as the greatest amount of butter to be obtained. These particles, to enable them to adhere together by their own attraction of cohesion, and form themselves into masses or butter, must be of a temperature and consistency to be formed, and retain such form as they may receive from the process of churning. This has been ascertained to be from 60° to 70° Fahrenheit, 62° to 65° preferred; if above or below these limits the process becomes imperfect; when above this point the best quality of the particles, like the best oils, remain fluid, and are not congealed enough to take any form or adhere together but remain in the milk; while if below, they are equally slow to unite, and adhere to each other from the opposite cause. Therefore, as the particles of butter are of far lighter gravity than the milk, they will instantly rise to the surface, the dash churn process, as with the dog power, is as perfect and uniform in its action as anything can possibly be made, where the cream itself is the only fulcrum to be acted upon as in this process of compression, as by each stroke, the particles are taken by the flat surface of the dasher down through the mass, compressing, or to use a sailor's phrase, "impressing" every stray particle into contact or service of those already upon the dasher, and as they rise as rapidly as an ordinary dasher is raised, all are acted upon very evenly and efficiently. The further from this principle any churn diverges, just so far is it from the best churn.

§ 123. Among the great variety and number of churns and the unwearied efforts of inventors and manufacturers to make and introduce, almost daily, new styles, it is not an easy task for an ordinary observer to select the best.

No other class of inventors have equalled the number of those who have brought out the butter churn and no theories of the processes so various and numerous as those claimed for the making of butter.

DOG OR SHEEP POWER.

Plate XII.

§ 124. Few more valuable implements, in or about the farm, are found than a good, cheap and efficient churning power; and few among the great variety of the machines manufactured at this establishment have met with so general approval and extended sale as the endless dog and sheep power. It is constructed upon two India-rubber straps by means of slats riveted to them; on the upper side of the slats are made fast small buttons which lap past the joints of each slat, and each in its turn lapping upon the next thus forms a self-supporting platform, on which the animal walks; the platform is supported at each end, and at proper intervals, along the whole length, with drums or pulleys; the motion of the endless platform giving action to the forward drum, through it to a crank upon one end and to a balance wheel upon the other, producing the necessary motion and steadiness required to operate the ordinary dash churn. It has also a compensating arrangement upon the side of its frame, through which the lever moves up and down, causing it to move the dasher handle vertically, without any see-saw or rocking motion, thereby avoiding all friction and resistance of the dasher and churn. See **Plate XII.**

A dog of thirty pounds and upwards, is all-sufficient for any dairy. It is as much used with sheep as dogs, and is not hard work for either. They are fitted with pullies, when desired, for driving the Crank Churns, Corn Shellers, Grind Stones, &c.

Price, complete, with pulley,.....	\$15 50
Price, complete, without pulley,.....	15 00

THERMOMETER CHURN.

Plate XII.

§ 125. For hand use the crank churn is perhaps more desirable, as it is more in consonance with the muscular system of the human frame, and with a horizontal shaft near the surface of the cream in the churn, having flat arms and blades upon it sweeping downward into and through the cream, the dasher process is observable. Such churns are made of various forms, as round and square, and of wood and sheet metal, the most complete of which are those with two zinc metal cylinders, the inner one for holding the cream, and the space between them for the introduction of hot or cold water to regulate the temperature, which is indicated by inserting the thermometer in the cream, or what is better, have it fixed in the head of the churn in contact with the cream, as shown in **Plate XII**, center left hand of the page. These are the most complete and approved now in use. The prices vary according to size.

No. 1..... 4 gallons,.....	For 1 to 3 cows,.....	\$3 50
No. 2..... 7 ".....	For 3 to 5 cows,.....	4 00
No. 3..... 9 ".....	For 5 to 8 cows,.....	4 50
No. 4..... 12 ".....	For 8 to 16 cows,.....	5 00
No. 5..... 15 ".....	For 16 to 24 cows,.....	6 00
No. 6..... 30 ".....	For 24 cows or more, with 2 cranks,.....	12 00

COMMON WOOD CYLINDER CHURN.

Plate XII.

§ 126. This is seen in the middle back ground of the center of **Plate XII**, is similar in its operation and use as the churn last described. It is a simple wood cylinder with crank shaft and beaters, and is perhaps in more general use than any other crank churn. It is the cheapest and most simple, and with the use of a thermometer to get the cream at a proper temperature, before it is put into the churn, the farmer can churn with it as easy and well as with the thermometer churn. Prices and sizes are as follows, for the four sizes now made:

No. 2— 2 to 5 cows, 6 gallons,.....	\$2 25
No. 3— 5 to 8 cows, 9 gallons,.....	2 75
No. 4— 8 to 16 cows, 12 gallons,.....	3 25
No. 5— 16 to 24 cows, 15 gallons,.....	4 00

DASH CHURN.

Plate XII.

§ 127. Probably no process known is more correct than that of the common dash churn, which is shown as attached in working order to the dog power at right hand lower corner of **Plate XII**. The specific gravity of the particles of butter is much less than that of the milk, and they instantly rise to the surface, and each stroke of the dasher carries the particles with a compressing force against others below them—the milk itself forming the fulcrum. Prices and sizes of dash churns of best white oak or cedar and iron bound,

No. 1— 16 to 24 cows,.....	\$3 00
No. 2— 8 to 20 cows,.....	2 75
No. 3— 5 to 12 cows,.....	2 50
No. 4— 3 to 8 cows,.....	2 25
No. 5— 1 to 5 cows,.....	2 00

EMERY'S CHEESE PRESS.

Plate XII.

The requisites of a good cheese press are a continuous and uniform pressure upon the cheese during the pressing process, and the practicability of adapting it to the required force for cheeses of all sizes, in such a manner that they shall be uniformly pressed.

§ 129. The press, as shown in **Plate XII**, in center right hand, is one of the most efficient, cheap, convenient, simple and portable ever made, and is in very general use in several of the largest cheese-making counties in this State. The illustration is too plain to need any description. It is a simple rack and pinion—the rack extending upward from the follower, and passes the pinion which is inside the frame; the pinion is fitted upon the same shaft with the ratchet-wheel seen upon the side of the frame. One end of the iron lever which passes across the press, is fastened upon a fulcrum bolt at one side of the press, and passes through an iron guide, and receives the necessary weight upon the extended end. Upon the iron lever near the fulcrum bolt is attached a hook or pall, which, on raising the weight end of the lever, catches hold of the teeth on the large wheel, and on letting go the lever, the hook pulls upon the large wheel, and by it the pinion is turned in the rack, producing the downward pressure, which continues until the lever rests upon the guide, when the attendant simply raises the lever and weight again, and the hook takes hold of other teeth in the wheel. The whole press weighs about 150 pounds, and suitable for a cheese of 50 to 100 pounds. Price \$12.

BUTTER WORKER.

Plate XII.

Much depends on the manner of working the butter after it is churned, as this is but a continuation of the process of churning, and consists chiefly in expelling the remaining milk from among the particles of butter in the mass, as it is taken from the churn, which, if not thoroughly done, will in time become rancid, and produce what is termed strong butter, and which depreciates it in price from 10 to 30 per cent in market.

§ 130. A good butter worker is shown in the middle foreground, and is made of a quadrant-formed hard-wood table, upon three legs, with ledges on the two straight sides, coming nearly together at the square corner. The leg at this corner is a little lower than the other two, which causes the milk and water to drain off into a pail or tub for the purpose. Over this table is a fluted conical cylinder, with a hole through its center for a handle to pass through, and attach to an iron staple at the lower end. It is operated by rolling it backward and forward over the whole table, where the butter is kneaded over and over as a baker kneads his dough. The salting and seasoning is also done with the same machine. This is also very useful for bread-making purposes when desired.

Price, all wood,..... \$7 00 Price, with marble slab,..... \$15 00

SHINGLE SAWING MACHINE,

FOR

HORSE OR OTHER POWER.

Plate VIII.

§ 131. This machine consists of a slitting saw of suitable diameter mounted upon a substantial mandrel, having on the other end a heavy balance wheel; the latter is only needed where the power is limited, as for instance when used with a Horse Power.

The whole arranged upon a wood frame similar to that of the common wood saw; also with ways and a sliding table, with an adjustable vibrating gauge.

The bolt or block of wood to be sawed is laid upon this sliding table, and pressed against the gauge by the left hand, while with the right hand this sliding table is pushed forward, carrying the bolt and gauge, cutting off the wood between the saw and the gauge.

The piece so cut off forms the shingle, which may be made any desired thickness by adjusting the stops of the gauge, and the tip or taper may be made either way at the option of the sawer by vibrating the gauge which is hung upon a pivot at its center, as he presses the bolt against it with his left hand, so as to bring either end of the gauge nearer to the saw.

The advantages of this Machine are, its cheapness, simplicity and portability.

§ 132. The shingle bolt being managed by the hand, may be turned end for end from time to time, to avoid making any bastards, and the butts of the shingles may be made either way to avoid sawing crosswise the grain, thus making more shingles and better ones, and it can be fed as fast as the saw will cut, according to the thickness and hardness of the wood.

§ 133. All the parts embraced in the shingle sawing apparatus are also made in the form of an attachment to be used upon the ordinary railroad wood saw-mill described in § 42.

The Machine may be operated by horse or any other power, and will saw from four to six thousand shingles per day, according to the power used and dexterity of the sawer.

Price of Shingle Machine, with a 24 in. circular Shingle Saw, all in running order, complete,..... \$50 00

The Shingle attachment for the Common Circular Wood Saw-Mill, including a 24 in. Shingle Saw, 30 00

Shingle jointers are also furnished, to be operated by the foot, at \$10, or with cam and pulley for \$15, which are efficient, cheap and easily operated.

PLOWS.

Plates XVI and XVII.

§ 134. In the construction of their plows the proprietors have spared neither cost or efforts to make them superior in points of utility and workmanship; and they hazard nothing in saying that their patterns, as well as their machinery, expressly invented and used by them in their construction, are superior to that of any similar establishment in the world.

Thirty years' experience and observation in the making and using the cast-iron plow, as well as practically testing their own plows with those of nearly every other manufacturer of any note in this country, enables them to judge of the relative merits of all, without prejudice; and they are enabled to say that their assortment comprises the best patterns and styles now in use, and that when the qualities of the materials used and workmanship, together with the cost of both, are considered, their prices are lower than those of any other manufacturer for corresponding sizes and weight.

§ 135. The machinery used in the construction of their plows produces a perfect uniformity in all the several parts of the wood work of the same size and number of plow, which facilitates their operations and enables all parts of the wood work to be repaired or replaced, if worn or broken, equally as readily as the points and other parts of the castings; and what is most important of all, it secures a positive uniformity in the operation of their plows when new, or with repairs of wood or iron work, which can be applied by any farmer at home.

The best of Worcester county (Mass.) white oak is used in their stocking, and which has no equal in strength or durability. The metal of which the castings are made, is chiefly the Charcoal Salisbury iron, with a proper mixture of other kinds, which produces fineness of grain and hardness, without increasing the liability of breaking by use or accident, and enabling all those portions which are most exposed to wear, as the edges and wings of the points and bottoms of the land sides to be chill-hardened, or tempered harder than tempered cast-steel, more than tripling their durability, and working more easily; also, always remaining sharp until worn through and worthless, besides maintaining a uniform action in working to the last moment.

All their plows are cast with facing, the sand scale removed by acid, and all the wearing surfaces ground to a bright polish, which insures their operating as well in the first or second furrow, as they ever will, and with much greater ease to plowman and team. These bright portions of the castings are covered with a semi-transparent blue varnish, which prevents oxydation during transportation to any part of the world, and for any length of time before being used.

§ 136. Although the modern plow is vastly improved over those in use fifty or thirty, or even twenty years ago, no cessation of efforts of inventors seems perceptible, and they are as constantly introducing their productions to the public. Of all these inventions, more than ninety per cent are worthless and soon forgotten, from the fact that they prove to be either no improvement, or as is often the case, actually objectionable, as compared with previously introduced and popular plows. The chief cause of this disappointment arises from the want of a proper knowledge of the philosophical and mechanical elements which combine to make a good plow, in the form of its working parts, as well as in the construction for the application of the propelling and guiding forces for the successful operation of the *commonly supposed simple implement, the plow*.

§ 137. The first thing in order, in making a good plow, is the requisite form and size of the working parts in the ground, which should be such as is required for the soil and work to be done, as a plow that is best for turning under green sward would be illy adapted and unsuitable for the fine pulverizing and working old broken and stubble land; also on the selection of materials much depends, as the plow best adapted for clayey, gravelly and sandy soils is made of cast-iron, while the same form and material is found useless in the rich prairies of the west, where alone the best of cast-steel is used, and of a form which actually increases the resistance instead of avoiding it, in order to force that fine metal to scour and prevent clogging.

When all these points are gained, the plow is but half completed, the most important being the proper stocking of the same, so that the force of the team shall be most effectually applied, and secure the utmost ease to both plowman and team, and cause the plow to move through the ground with the steadiness of a boat upon the water, at all times maintaining its course and size of furrow, for which the plowman, like a pilot, has set and directed it, requiring little or no care or effort, except when encountering impediments in its course, or during its turnings at ends of furrows.

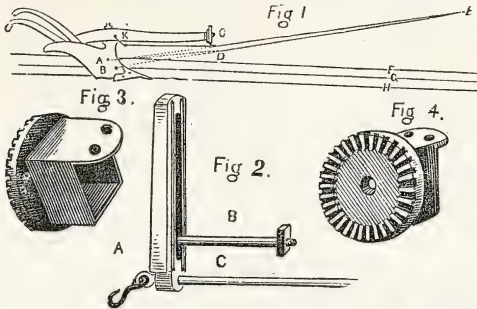
§ 138. From the complicated structure of plows and the manner in which circumstances require the application of the force to operate them, many misconceptions and theories have arisen as to the proper construction to effect their desired operation.

It will be admitted that all plows have a right line of draft when in operation, and which is an imaginary line extending from the center of the resistance upon the mould-board of the plow to the point of draft of the team, which is at the connection of the traces to the hames of horses, or the staple of the yoke with oxen. Were it not for considerations of convenience, a straight bar or beam, firmly attached to that point on the mould-board, and extending to the point in the hames or staple by which to propel it, would answer all purposes, perhaps better than the present form of beam.

PLOWS.

Plates XVI and XVII.

The draft being but the means by which the desired end is to be accomplished, it must be subservient to that end; therefore, as the beam, if placed as described, would obstruct the successful operation of the plow, an indirect application becomes necessary, and is obtained by the rigid and strong connection of the present beam with the body of the plow itself, and thus produce what is termed a bent lever, by which the desired end is accomplished, as will appear from the annexed diagram in fig. 1.



F, represents the surface of the ground; H the bottom of the furrow; B the supposed center of the resistance of the furrow slice upon the mould-board; E the point of draft, as the hames of horses or yoke of oxen. The line of draft, in this case, extends from B to E, and the attachment to the plow must be at the point D, and if the end of the beam itself does not intersect this point, an adjustable clevis, which is firmly fixed on the beam with a draft ring at point D, will answer the purpose and insure the proper depth and steady motion of the plow. The same is true as to the width

of the furrow slice to be cut, the end of the beam or clevis on it must intersect this line also to insure the proper action of the plow.

§ 139. Perhaps as many inventions for the application of the draft for plows have been made, as for all other things about them. The most simple are those which are of iron and

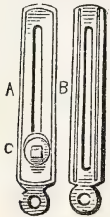


Fig. 5.

fitted with a socket on the end of the beam with a disc, having a series of teeth or notches across which an iron plate or guide bar is bolted, as shown in the annexed figures 2 to 5. Fig. 3 shows the socket of the disc to fit the end of the beam; fig. 4 the face for disc with its teeth; fig. 5 the guide bar; A the front side with the bolt-head C, which confines it to the disc; B the back side of it with its splines, which fit into the teeth of the disc. Fig. 2 shows edge view of the guide bar and its confining bolt; also a section of the draft rod and hook, which passes through the eye in one end of the guide bar. This draft rod passes along under the beam to any point desirable or convenient, as shown in fig. 1; it is connected to the beam near the coulter bolt at K.

§ 140. It will appear, from this explanation, that just so often as these circumstances are changed, this line of draft is disturbed. A wider or narrower, a deeper or more shallow furrow, as well as the differences in the nature and tenacity of the soil, and the length of traces or chains of the horses or oxen, or their height, are all contingent circumstances attending the use of any plow; and to enable it to work equally well under them all, not only the plowmaker should construct them properly, he must put with them all the requisite facilities of adjustment, and the plowman should know how to apply them.

The DIAL GAUGE CLEVIS, as described, is considered as simple, cheap and efficient as any invention for the purpose, and when applied to a well-constructed plow, the manufacturer has done his whole duty. The clevis and draft rod complete is worth one dollar and fifty cents when sold separate from the plow, and when fitted to almost any badly constructed plow it will generally remedy the difficulty of bad stocking. For subsoil plows, as well as for plowing bog lands, this dial gauge clevis is always used to obtain a greater variation of the application of the draft; and where it is desirable for the team to walk all the time on the unplowed land, instead of one of the animals traveling in the bottom of the previous furrow.

GREEN SWORD PLOW.

Plate XVI.

§ 141. This first plow on the plate, of which there are several sizes and series, is rigged with the cutter with strap fastenings, which firmly secures the cutter to operate at any depth, point and angle to the side of the beam, and avoids weakening it by not cutting a mortice through it for the cutter, as is ordinarily done by other makers.

§ 142. This plow has also a gauge wheel under the beam. This is adjusted to run at any elevation above the point of the plow, and governs the depth of its working. In rolling and hilly land, it is almost indispensable; on level land it should be used, but is not as important, as the line of draft is less disturbed, and the ordinary clevis arrangement will secure nearly perfection in its working; while in plowing undulating land the line of draft is continually changing, and producing a tendency to plow deep and shallow by turns, as well as wide and narrow furrows, causing much unnecessary and hard labor to both man and beast, which a gauge wheel will entirely obviate. No breaking plow is complete without the cutter and clasp fastenings, and gauge wheels.

MICHIGAN SOD AND SUBSOIL PLOW.

Plate XVI.

§ 143. Of this there are two sizes. It consists of a well-formed plow with a smaller plow attached to the same beam and in range with the main plow—the object being to cut and turn the furrow in two separate slices; the smaller one being adjustable to any depth from one to four inches, and cuts the sod and turns it into the bottom of the last furrow without breaking it, the main plow following close in its wake, raises the subsoil, and by its peculiar wedgelike form and convex curves, breaks and pulverizes the earth and lays it high upon and over the unbroken sod which lies at the bottom. For plowing sod land, or plowing under green crops for enriching the land, and planting and sowing for a crop, this is probably one of the best systems of plowing ever adopted, and which is becoming very popular, and the plows are meeting a very ready sale.

§ 144. The main plow without the small one attached, is one of the best stubble or old land plows in use. The additional power required to cut and turn the double furrow of even depth with this double plow or with a single sod plow, is nominal, and by some it is claimed to be done with less force, as two thin slices are more easily turned than if in one compact mass. The additional cost for the double plow is four to five dollars over a single plow for the same size furrow.

LOCK COULTER PLOW.

Plate XVI.

§ 145. This is the third in the plate, and has the dial gauge clevis attached. These are designed for heavy work among roots and underground obstructions, and are furnished with a strong steel-laid coultter, which is made fast to the beam and also into the front part of the share of the plow. They have also, when ordered, strong shares with steel wings, which are intended to cut off tap roots, while the coultter cuts its way among the horizontal roots of trees and shrubbery, making clean and comparatively easy work for the team.

§ 146. For reclaiming bog meadows this is the best plow in use. It is furnished with an additional cutter with a convex cutting edge, and set on the beam forward of the coultter, its point inclining backward; also with a broad cast-steel wing to the share. It cuts to any required depth and turns over the slice unbroken, the dial gauge clevis allowing the team to walk on the unplowed land.

SIDE HILL OR SWIVEL PLOW

Plate XVI.

§ 147. This is one of the most ingenious and popular inventions of the past fifty years, and is the fourth plow in the plate. It was the invention of Mr. John Rich, of Troy, New York, who still survives, and although upwards of eighty years of age, is still working away at his old occupation, plow making. This is the only successful principle for a swivel or side hill plow in use, and is made and copied everywhere, and with as great a variety of forms as other plows. There are five sizes, ranging from a small one-horse to a large road plow, for three or four yokes of oxen. The size best calculated for farm use for two horses, is a good formed plow for either side hill or level land, and very extensively used for plowing level fields and avoiding making the dead furrows and ridges, and for turning the furrow from fences, &c., &c., which cannot be done with the common plow.

§ 148. In changing the mould-board from side to side, little or no effort is required, as the plowman simply unhooks the iron hasp, which reaches from the wood standard to a hole in the upper edge of the rear end of the mould-board, and by turning the handles over towards the mould-board, it causes the latter to fall flat on its face, and the motion of the team in coming round, will bring it up again upon the other side of the standard, when the plowman has simply to put the same hasp into a hole for the purpose, in the other edge of the mould-board, which is now uppermost. Each edge and wing of the point act as cutter and wing alternately, precisely the same as with any other plow. For working roads and excavations, the swivel plow is almost universally used where its advantages are known. This plow should generally have a gauge wheel under the beam, as it is a great help in working and governing it upon side hills, &c., &c.

COMMON STUBBLE PLOW.

Plate XVII.

§ 149. This is the third plow in the plate, and is commonly used for farm work. There are five sizes, each of two or three series of patterns, to suit various sections and soils, ranging from the small one-horse plow, thirty-five pounds weight, to those for large and deep furrows, of twelve by twenty inches, and weighing two hundred pounds each.

DOUBLE MOULD BOARD PLOW.

Plate XVII.

§ 150. This plow is used for furrowing land preparatory to planting; for plowing between rows of planted crops, for hilling them; for trenching or surface draining as well as ridging, as is often done in low or wet lands, preparatory to planting on the ridges. It is very useful, and does double work of a common plow, and better, while it is drawn with the same ease. There are three sizes, ranging from a very light plow of thirty-five to eighty pounds.

SUBSOIL PLOW.

Plate XVII.

§ 151. This plow is properly named, and is the second in the plate; and is a subsoiler in operation as well as name. It is used by a second team, which follows after another with the common plow, and simply penetrates deeper and breaks up the subsoil to any desired depth, according to size of plow and power of the team; and when thus broken up leaves it in the same furrow, to be covered where it lies by the next furrow of the common plow, which precedes it throughout the field. For many soils this system of plowing is adopted and is indispensable to secure a more uniform moisture and temperature of the earth, as well as to break up the hard pan or bottom, caused by previous cultivation, which from years of shallow plowing have become trodden hard and almost impervious to the roots of plants or to the warmth, moisture or air from above or below.

§ 152. These plow patterns are from those most approved in the highest cultivated sections of Scotland, from whence were imported, in 1840, the first and best samples, and made entirely of wrought iron, which were of Smith's Patent, of Deanstone, Scotland. They have been reconstructed, and wood substituted for iron, and cheapened, so that a plow is now furnished at this establishment which will do the same work and with much more ease to both man and team, for one-third the price of the imported plows. As shown in the plate, it has the dial gauge clevis, and gauge-wheel upon the beam. The body of the plow consists of a plate casting, extending from the bottom to the beam, and about one inch thick. It has a share about four to six inches broad at the bottom, and also a shelf or lifter which has one end fitted to the point, and extends to the rear of the plow. This lifter is adjustable, high or low, and serves to break up the subsoil, and allows it to fall in its rear.

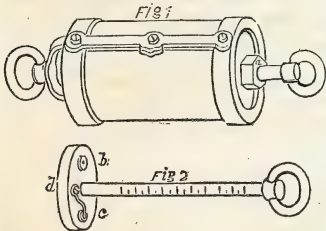
§ 153. Some of them have the point extended on both sides alike, and a lifter on each side also. These last are used mostly for mole draining, as the lifters raise the earth from the bottom and disturb it, and when they have passed, the earth on both sides falling at the same time, meet each other before they can reach the bottom, and there remains the simple crevice of an inch, made by the body of the plow closing, and leave a triangular arched drain.

For cold and wet grass meadows and pastures, this is an excellent plan for draining surface water, allowing air and heat to penetrate, and it will last several years in most soils.

§ 154. A subsoil plow run once through between the rows of planted crops, as corn, &c., when it is quite small, will add materially to the product on any land.

Emery's Cylinder Dynamometer.

§ 155. In testing and experimenting with plows, the greatest difficulty has been found in determining the relative ease of draft, as no instrument in use was calculated to determine it; leaving almost as much to the decisions of the operators and the judges' minds and observations, as to the instrument itself. From this need of a proper instrument, the following was designed, and found, when completed, to answer all purposes, and with an accuracy not otherwise determined. It has been used in selecting and testing the plows here offered to the public, as well as a great many others not in this catalogue.



It consists of a strong iron cylinder about eight inches long, and two and a half diameter, into which a piston is ground steam-tight; the piston rod passing through a stuffing box in the cylinder head, and receiving in its end the draft ring.

This cylinder being filled with a non-elastic fluid, and the piston having a small orifice through it, it can be drawn from end to end as the fluid changes position through the orifice in it, and the aggregate amount of power consumed by each plow during its operation is self-registered on the piston rod on the completion of its furrow. See figs. 1 and 2.

§ 156. This has become the acknowledged standard for measuring the force and resistance of all kinds of agricultural implements, as plows, mowers, reapers, wagons, &c.; &c., and adopted by a large number of agricultural societies, including the United States, several State and county societies in the United States, as well as the Colonial Societies of Canada. They can now be supplied to agricultural societies, with all necessary fixtures for attaching to plows, reaping machines, &c., with a substantial case to contain, for \$50 each.

Retail Prices of Plows, with Polished and Chill Hardened Castings.

DESCRIPTION OF PLOW.	NAME AND NUMBERS.	Rigged with Clevis and one extra Point.	Extra for Gauge Wheel and Hangings.	Extra for Cutter with Clasp and Bolts.	Extra for Dial Gauge, Clevis and Draft Rod.
1 Horse, Corn,	No. 1, Emery's Improved,	\$4 00	.....	.....	.....
1 Horse, Corn,	No. 2, Emery's Improved,	5 00	.....	.....	.....
2 Horse, Light, ...	No. 3, Emery's Improved,	6 50	\$1 25	\$1 25	.....
2 Horse, Medium, ..	No. 4, Emery's Improved,	7 50	1 25	1 50	\$0 50
2 Horse,	No. 5, Emery's Improved,	8 50	1 25	1 50	0 50
2 Horse, Heavy, ..	No. 6, Emery's Improved,	10 00	1 50	1 50	0 50
2 Horse, Medium, ..	No. 4, Excelsior, Stubble,	7 50	1 25	1 50	0 50
2 Horse,	No. 5, Excelsior, Stubble,	8 50	1 25	1 50	0 50
2 Horse, Medium, ..	No. 71, Deep Furrow, Flat,	9 00	1 25	1 50	0 50
2 or 3 Horse,	No. 73, Deep Furrow, Flat,	10 00	1 50	1 50	0 50
2 Horse, Medium, ..	No. 70, Deep Furrow, Lap,	8 50	1 25	1 50	0 50
2 or 3 Horse,	No. 72, Deep Furrow, Lap,	9 50	1 25	1 50	0 50
4 Horse,	No. 74, Deep Furrow, Lap,	10 50	1 50	1 50	0 50
2 Horse, Medium, ..	No. 2, Eagle,	8 50	1 25	1 50	0 50
2 Horse, Medium, ..	No. 2, Eagle, Lock Coulter,	10 00	1 25	1 50	0 50
2 or 3 Horse,	No. B, Eagle,	10 00	1 50	1 50	0 50
2 or 3 Horse,	No. D, Eagle, Lock Coulter, ..	12 00	1 50	1 50	0 50
1 Horse, Light,	No. 1, Self-Sharpener,	5 00	.....	.....	.....
1 Horse,	No. 2, Self-Sharpener,	6 50	1 25	1 25	.....
1 Horse, Light, ...	No. A, 1, Emery's Improved, ..	3 50	.....	.....	.....
1 Horse, Medium, ..	No. A, 2, Emery's Improved, ..	4 50	.....	.....	.....
1 Horse, Medium, ..	No. 15, Emery's Improved,	4 50	.....	.....	.....
1 Horse, Light, ...	No. 1, Double Mould-Board, ...	3 50	.....	.....	.....
1 Horse, Light, ...	No. 1½, Double Mould-Board, ...	4 00	.....	.....	.....
1 Horse, Medium, ..	No. 1½, Double Mould-Board, ...	5 00	.....	.....	.....
1 Horse, Heavy, ..	No. 2, Double Mould-Board, ...	6 50	1 25	1 25	0 50
1 Horse, Light, ...	No. 0, Swivel or Side Hill,	5 00	.....	.....	.....
1 Horse, Medium, ..	No. 00, Swivel or Side Hill,	7 00	.....	.....	.....
2 Horse, Light, ...	No. B, 1, Swivel or Side Hill, ..	9 00	1 25	1 50	0 50
2 Horse, Medium, ..	No. B, 1½, Swivel or Side Hill, ..	9 50	1 25	1 50	0 50
2 Horse, Medium, ..	No. A, 2, Swivel or Side Hill, ...	10 00	1 25	1 50	0 50
2 or 3 Horse,	No. A, 3, Swivel or Side Hill, ...	12 00	1 50	1 75	1 00
4 Horse,	No. A, 4, Swivel or Side Hill, ...	14 00	1 50	1 75	1 00
2 Horse, Medium, ..	No. 83, Swivel for Level Land, ...	10 00	1 25	1 50	0 50
1 Horse,	No. 0, Subsoil,	6 00	.....	.....	.....
2 Horse,	No. 1, Subsoil,	7 50	1 50	1 25	1 00
2 or 3 Horse,	No. 2, Subsoil,	9 50	1 50	1 50	1 00
2 Horse, Michigan,	No. 5, Sod and Subsoil,	9 50	1 50	1 50	1 00
3 Horse, Michigan,	No. 6, Sod and Subsoil,	11 00	1 50	1 50	1 00

CULTIVATORS AND HORSE HOES.

Plate XVII.

§ 157. These useful implements have been very generally introduced throughout the country and become a necessity. They are made for almost an innumerable variety of purposes and of various sizes and styles, as well as forms of teeth required for the different work to be done. A one horse cultivator, with five teeth and a gauge wheel, as shown in **Plate XVII**, is in most general use for working between planted crops. The teeth are of polished cast steel and held to the beams by means of bolts passing up through the head of the teeth and beam, with a screw nut and washer on the top. These teeth are of various lengths; ten to twelve inches are preferred. This size, rigged as shown in plate, is worth \$6.50. When rigged with five beams and eleven teeth for two horses, they are worth \$11.00. The teeth are furnished separately at from 40 cents to 60 cents each; bolt for same 8 cents.

§ 158. When rigged for one horse with three teeth, one in the center and one on each side, it is called a **HORSE HOE**, and is known as "Sayres' Patent." The side teeth are made with a mould-board form and adjustable to any angle and width of rows, and to turn the earth and weeds either to or from the plants, and work any depth at pleasure. The three teeth can also be moved together so as to form a perfect double mould-board plow, which operates precisely as that shown in bottom of **Plate XVII**, and as described in sec. 150. This is rigged with two gauge wheels, one in front and one in center, and is used for every purpose for which cultivators are required. It also has the additional advantage of being substituted for the hand hoe and accomplish more and better work than ten men. Price \$12.

REAPING AND MOWING MACHINES.

Plate XIV.

§ 159. There are so many machines now before the public, for which all their makers claim superiority, and so many of them with established and favorable reputations, it is quite difficult to decide which is best. When fewer kinds were known, there was less difficulty; as they have become more generally used, their necessities for operating most successfully on all kinds and conditions of land, have caused numerous improvements to be made, until the names and number of them have become legion. The variety now is nearly as great as that of plows, and each especially best adapted for its own purpose, while comparatively few are as well adapted to all varieties of land and uses. Among those well established as a simple mower, are to be found the

BUCK EYE,
ALLEN'S,

HALLENBECK'S,
MANNY'S,

each of which have peculiarities of their own, and while they are nearly equal in capacity, cost and quality of working, few, if any of them, are as good as a reaper. Manny's is probably the best of those named, when considered as a combined machine. Manny's Mower, with latest improvements, for reaping and mowing combined, is illustrated in upper part of **Plate XIV**. As to reapers, the same variety exists, among which are the following:

McCORMICK'S.....	Side Raker Delivery, with reel,	HALLENBECK'S ..	Back Rake Delivery, without reel.
MANNY'S	Side Fork Delivery, with reel,	ALLEN'S.....	Back Rake Delivery, without reel.
SEYMOUR & MORGAN'S	Side Self Delivery, with reel.	BUCK EYE	Back Rake Delivery, without reel,

All the above are claimed to be good mowers as well as reapers by their makers.

§ 160. When made to answer both purposes as a mower and reaper, most machines become more cumbrous and complicated, which has often been a drawback on their merits for either purpose. All the above machines are furnished at the manufacturers' prices, and a constant supply of the following kinds are kept on hand for sale and exhibition, others are furnished to order at the shortest notice; also repairs and repairing done for same.

Buck Eye Mower.....	\$120	Ketchum's Mower.....	\$115
Hallenbeck's Mower.....	116	Manny's Mower, with castor wheel.....	120
Allen's Mower,	120	Manny's Mower and Reaper, with castor, ..	125

§ 161. After this season it is the intention to manufacture their own mowing and reaping machines, the demand for other articles of their manufacture requiring all the facilities and attention thus far, and compelling them to sell those of other makers. All machines sold by them are warranted.

HORSE HAY RAKE.

Plate XIV.

§ 162. This implement, although of comparatively recent invention, is now universally adopted throughout the hay producing sections of this country. They are made of a multitude of forms and styles, and of as various prices. Those most simple, cheap and efficient, and which are in most extensive use, are the so called Pennock's style, as represented in the middle center of **Plate XIV**. It is a revolving wood head and teeth rake—so made as the thills cannot fall upon the ground, and require very little effort of the attendant, except in dumping, which is done by slightly raising the handles at the proper moment. They are about nine feet long and from eighteen to twenty teeth, which are usually round, and extend about two feet each way from the head. With the travel of three miles per hour, it will rake about three acres in that time, and is not hard work for one horse. There are several other styles of revolving hay rakes, but the nearer they approach the one described the better they are for use. The prices are as follows:

Ash and Maple Rakes.

Extra, 9 foot head, 18 and 20 round teeth,...	\$5 50
No. 1, 9 foot head, 18 round teeth,.....	4 50
No. 2, 9 foot head, 18 round teeth,.....	4 00

Oak and Hickory Rakes,

No. 1; 18 round teeth,.....	\$7 00
No. 1, 20 round teeth,.....	7 50
Extra, square teeth,.....	7 50

WIRE SPRING TOOTH HORSE RAKE.

Plate XIV.

§ 163. In some sections the elastic wire tooth rake is used considerably; as shown in **Plate XIV**, it consists of a long axle with a pair of wheels; the teeth are of wire, about $\frac{3}{8}$ of an inch diameter, and coiled at their point of connection with the axle or around an attachment of the same; as represented, the thills are attached to the axle with cock eye bolts, and the axle itself is rolled by the driver, who stands upon it and has hold of a lever for the purpose; by pressing on the lever he turns the axle and raises all the teeth high up from the ground, dropping the hay when and where desired.

Price, with wheels, complete,	\$20 00;	without wheels,	\$12 00
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HORSE UNLOADING FORK.

Plate XIV.

§ 164. This is a new article, and is shown in the middle center background of **Plate XIV**. It has a short head and handle of wood, with four long strong cast-steel teeth. It is hung and handled by means of an iron bail, attached by cock eyes near each end of the head, and when raised parallel with the handle, it is attached to it by a catch. A rope and sheaves are attached in the barn high over the load of hay, one end of the rope is attached to the eye in the top of the bail and over the sheave, and down to the ground, where it passes another sheave and a horse attached; the operator puts the points of the teeth into the hay, and with his feet crowds them home into the load of hay; the horse is led steadily away from the last sheave, and the fork is raised with its hay, and when swung over the place to be discharged, the man on the load pulls a cord which raises the catch of the bail, and the teeth instantly turn point downwards and hay discharged and another fork full taken, and so on; any load can be raised into the highest barn, in from five to ten minutes. It is one of the most labor-saving and desirable and new implements of modern invention.

Price of Fork, \$7 00; with Sheaves and Ropes, \$15 00

WHEEL BARROWS.

Plates XI and XIII.

§ 165. These useful implements, of all sizes, styles and prices, are kept constantly on hand; that shown in the lower background in **Plate XI**, is called the Garden Barrow, and has the sides removable, and can be used with or without them; there are three sizes and as many styles, ranging from \$4 to \$7.

That shown in the upper left hand of **Plate XIII**, is called the Canal Barrow, and used in excavating earth and in the construction of railroads and canals; also, for coaling steamers, &c. There are different sizes for both purposes; for canal and railroad purposes they are worth \$2.25 to \$3; for coaling purposes from \$5 to \$8 each.

IRON DIRT SCRAPER OR OX SHOVEL.

§ 166. This implement is found indispensable for the purposes of road making, leveling hills and hollows, excavating cellars and wide ditches, and generally useful on the farm.

The style, as shown in the upper portion of **Plate XI**, is made entirely of iron, except the handles, which last are of wood, and are bolted to the iron sides. There are several sizes from 24 inches to 30 inches wide, and heavy and strong in proportion. They are easily managed and are readily drawn upon the ground, carrying the dirt any distance without requiring any handling, except in filling and dumping.

Prices—No. 1, 24 inch,.....	\$5 00	No. 3, 28 inch,.....	\$7 25
No. 2, 26 inch,.....	6 00	No. 4, 30 inch,.....	8 50

STORE TRUCKS.

Plate XI.

§ 167. These are used in moving boxes, bales, barrels, &c., &c., in stores and warehouses, as well as on steamboats, &c., &c.; they are variously constructed and of several sizes. That in the lower middle ground of **Plate XI** represents such as are used chiefly on steamboats, with broad face wheels and concave iron cross girts, &c. Prices vary according to size and manner of ironing them, from \$4 to \$12. Railroad baggage trucks, superior article and most approved style, \$20 each.

BUSH OR ROOT PULLER.

Plate XI.

§ 168. This is a strong iron instrument, made with two, three or four claws, and strong enough to withstand the power of the strongest team of oxen; when used, they are hooked to the bush close to the ground, and the draft chain hooked into the head or eye of the implement, when the cattle readily remove the roots. It is a great labor-saving implement; they weigh from thirty to one hundred pounds, and are worth about ten cents per pound; it is shown at the lower right hand of **Plate XI**.

VEGETABLE CUTTERS.

Plate XII.

§ 169. These cut the roots or vegetables into thin slices, and by means of cross-knives the slices are cut into narrow strips and pieces, and operate with great rapidity and ease.

These knives can be set by the farmer to cut any fineness desired. Vegetables thus cut can be fed to cattle and sheep without any danger of choking them; their construction is simple, as will be seen on upper left hand of **Plate XII**. Price \$10.

GRAIN DRILL,

Plate XIII,

FOR SOWING ALL KINDS OF GRAIN, GRASS SEEDS AND FERTILIZERS,
FOR TWO HORSES.

§ 170. This seed drill is calculated for sowing all coarse grains as well as fine seed commonly sown by farmers—from corn and peas down to the smallest seed, as clover, timothy and other grass seeds, and for either broadcast or in drills. It is one of the most simple in its construction and machinery, as well as convenient and durable, and is believed to be better adapted to its various purposes than any other in use. See **Plate XIII.**

All the working parts, as well as the grain distributing apparatus, are in view of the operator, who can readily see the grain for several inches, in its fall from the seed box into the tubes to the ground, and may constantly know that the seed is being deposited.

Printed directions accompany each machine. They are furnished at the following prices:

Drill No. 1, 9 teeth,.....	\$90	With Grass Seeder,.....	\$106
Drill No. 2, 11 teeth,.....	100	With Grass Seeder,.....	116

§ 171. For sowing fertilizers at the same time with the seed, and to keep it in separate apartments from it, an additional hopper is attached, which will admit the fertilizer to pass with the seed into the ground through the same tubes of the drill. This attachment, as it is called, is furnished at the low price of \$20, and is probably the best, as well as cheapest method of using and sowing fertilizers.

BROADCAST SOWING MACHINE.

Plate XIII.

§ 172. This is a light machine, suited for one horse, and is constructed with an ordinary wagon axle, or perhaps a little longer, with common wagon wheels. A pair of thills are attached to this axle, by which it is drawn. A seed box, ten to twelve feet long, is placed across the thills and forward of the wheels, and extends past them both ways. This seed box has several cross-divisions in it to prevent the seed from flowing endwise in sowing on undulating land. The distributing is done by means of a cam motion on one of the wheels, which vibrates a series of agitators and distributing cells in the bottom of the hopper. The operator is seated above and back of the hopper, and has the whole in view all the time. In turning and moving about without sowing the seed, he instantly stops the action of the agitators and distributing cells, and as readily starts them again when ready.

The hopper is placed so near the ground that it will sow all kinds of seeds and fertilizers evenly, in a windy as well as still day. The hoppers are provided with an arrangement for sowing damp as well as dry fertilizers. The machine is shown in the back ground of the lower picture, in **Plate XIII.** They are adapted for all seeds, from peas, wheat, &c., to clover and timothy, heavy or light, as well as fertilizers, and any quantity per acre.

Price, with wheels, complete, with seed and fertilizer distributing apparatus, \$40; without wheels, \$32.

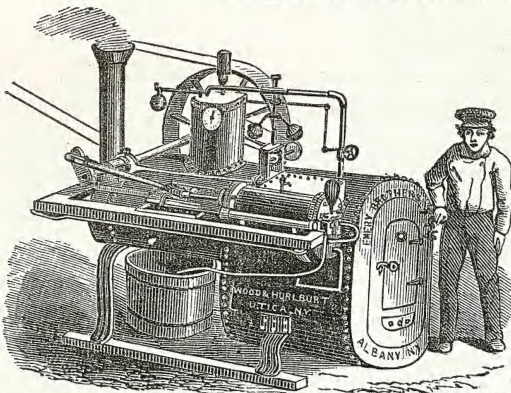
CAHOON'S PATENT BROADCAST
SEED SOWER.

FOR HAND AND HORSE POWER.

§ 173. This consists of a cloth sack or bag, which is slung in front of the person, by a strap around his neck, shoulders and waist, and capable of holding three pecks of grain. The bottom of the sack is connected to a sheet-iron funnel shaped hopper, which has an adjustable discharge and agitators inside for feeding out the grain. In front of the discharge is a revolving hollow conical cylinder, open at both ends, with radial blades inside. The cylinder revolves on a horizontal shaft at a high velocity, by means of small gears and crank, which the operator turns as he walks steadily over the field. As the grain passes from the hopper into the small open end of the cylinder, the centrifugal force given it by the blades and motion of the conical cylinder, causes it to scatter to the right and left, and perpendicular, before the operator, and falls to the ground more evenly distributed than by any other known process. The operator at his usual walking gait, will sow from four to six acres per hour, according to the specific gravity of the grain—wheat from forty to fifty feet, and oats twenty-five to thirty-five feet wide at each bout. With the machine attached to a large hopper and mounted in the rear end of a wagon, and driven by a band from the wagon wheels, an average of ten acres per hour can be sown. Several thousand of them have been sold and have given uniform satisfaction. It is the best hand broadcast sower, and by some it is claimed will supercede the expensive horse power sowing machines in use.

Price, complete, for hand use,..... \$10 00 For use by horse power,..... \$35 00

PORTABLE STEAM ENGINES.



These engines are valuable for machine shops of all kinds, for grinding and crushing grain, cutting and cooking food for stock, for threshing grain, sawing wood, ginning cotton, propelling boats, for elevators, for loading and unloading boats, and in fact for every purpose where power is wanted.

The cut represents a four horse engine and boiler. They are all constructed with a water space all round the fire box and under the ash pit. This causes all the sediment to fall under the ash pit, and not adhere to the boiler and flues, as would be the case if allowed to remain near the hottest part of the fire.

The prices named are for all complete for the smoke pipe and band, both of which can be furnished at the lowest rates, if ordered with the engine. Printed directions accompany each engine. They have been awarded the highest premiums by the New York State Agricultural Society and every other association where they have been exhibited.

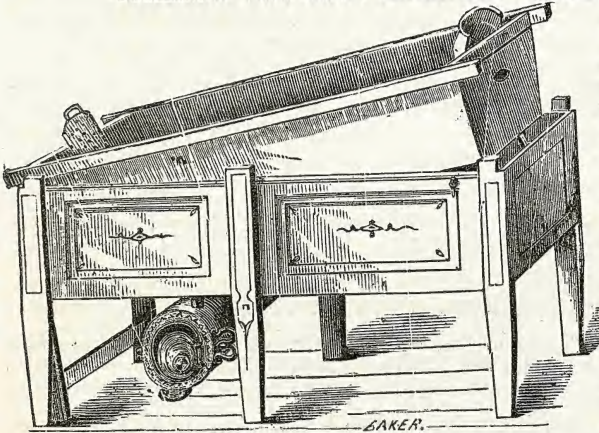
The following are among its characteristics: The machinery is permanently attached to the boiler, and the engine may be removed entire from place to place without deranging or injuring any part of it. The boiler is locomotive, which is the best in use, generating

from a third to a half more steam than others, with the same fire and water space, occupying less room, and adapted to both wood and coal. The exhaust steam passes directly into the smoke pipe, by which all sparks from the fire are extinguished. An engine of four horse power, for example, will cut a cord of wood from the log in *ten minutes*. To run an engine of this size, it takes about one-eighth of a cord of good dry wood, and one hundred gallons of water per day. For a fifteen horse power, about one cord of wood and three hundred gallons of water per day. Not only hard, but wood in all its forms may be used. The following is the LIST OF PRICES:

HORSE POWER.	CASH PRICE.	ESTIMATED WEIGHT.	SPACE OCC'D.	DIAM. FLY WHEEL.	FACE OF WHEEL.	HORSE POWER.	CASH PRICE.	ESTIMATED WEIGHT.	SPACE OCC'D.	DIAM. FLY WHEEL.	FACE OF WHEEL.
1½	\$175	1,000 lbs.	2x5 ft.	24 in.	4 in.	8	\$725	4,500 lbs.	9x6½ ft.	48 in.	8 in.
2½	275	1,800 lbs.	4x5 ft.	39 in.	5½ in.	10	880	5,900 lbs.	10x8½ ft.	60 in.	8 in.
3	325	2,000 lbs.	5x4 ft.	39 in.	5½ in.	12	1,025	7,000 lbs.	14x8½ ft.	72 in.	12 in.
4	400	2,200 lbs.	7x5 ft.	40 in.	6 in.	15	1,300	9,000 lbs.	15x7 ft.	72 in.	12 in.
6	575	3,000 lbs.	7x5 ft.	44 in.	7 in.	20	1,700	10,500 lbs.	16x7 ft.	72 in.	12 in.

STEAM AND WATER POWER.—A horse power in machinery, as a measure of force, is estimated equal to the raising 33,000 pounds over a single pulley, one foot a minute, or 550 pounds raised one foot a second, or 1,000 pounds raised thirty-three feet a minute. **MANUAL POWER.**—A man of ordinary strength is supposed capable of exerting a force of 80 pounds, ten hours in a day, at a velocity of 2½ feet a minute, or 75 pounds raised one foot a second. **HORSES POWER.**—The effective force or power of two horses, weighing two thousand pounds, and working upon Emery's Patent Railroad Horse Power, is equal to the force exerted by a four horse steam engine, by the mechanical rule for measuring power, as applied to machinery.

CHEESE VAT AND HEATER.—(ROE'S PATENT.)



This simple apparatus is unquestionably the most perfect and desirable invention for cheese making now in use. It has had the benefit of several years introduction, and is very generally adopted in the cheese making sections of this State. The N. Y. State Agricultural Society awarded it their first premium; also, the St. Lawrence, Jefferson, and Lewis County Societies, respectively awarded it their first premiums for the *best apparatus for cheese making*, and, considering the dairy interest is greatest in those counties, its character could not receive a higher endorsement. The vat is made double and portable—the outer one of wood, and with perpendicular sides and ends, and level bottom. The inner or milk vat is made of tin, and fits the outer one at the top, but its sides and ends incline inward, and do not extend to the bottom of the outer one; its bottom, therefore, is smaller, and a space is left all round the bottom and sides of the tin vat, which is used for the water chamber, and will contain from fifteen to twenty

gallons of water, according to the size. A heater is attached below the bottom, and is made of a double cylinder, with a water space between. The inner one, made of copper, forms the fire chamber, and offers 500 to 700 square inches of heating surface to the water. This water chamber of the heater is connected and communicates with water chamber of vat by two water pipes, for circulation of water from vat to heater, returning to vat as soon as it becomes heated. By this arrangement the water used for cooling may be used for heating without rehandling. Capacity sufficient for all heating necessary in one cheese making in 30 minutes, if desired, with but 15 to 20 lbs. good dry hard wood. The heat may be shut off at any time from the vat, and plenty of hot water furnished from heater—making it the most convenient and perfect apparatus for cheese making in the world. Full directions, with warranty, accompany each machine, and will be furnished by mail on application. **CURD KNIVES**, gangs of four and six double edge cast steel blades, with about ten feet of cutting edge to each knife, will be furnished when ordered; and, considering the importance of uniform and fine cutting of the curd, to insure equal scalding or cooking, and the expedition with which it may be done, without putting the hands into the scalding whey, these knives are found indispensable when once introduced.

OLD STYLE HEATERS.				NEW PATTERN HEATER, WITH OTHER IMPROVEMENTS.			
NO.	DIMENSIONS.	WILL HOLD.	PRICE.	NO.	DIMENSIONS.	WILL HOLD.	PRICE.
1	4 feet, by 22 inches.	56 gallons.	\$20 00	2	4 feet 9 inches, by 24 inches.	73 gallons.	\$30 00
2	4 feet 9 inches, by 24 inches.	73 gallons.	25 00	3	5 feet 6 inches, by 26 inches.	91 gallons.	32 50
3	5 feet 6 inches, by 26 inches.	91 gallons.	30 00	4	6 feet 6 inches, by 26 inches.	113 gallons.	37 50
4	6 feet 6 inches, by 26 inches.	113 gallons.	35 00	5	7 feet 8 inches, by 26 inches.	145 gallons.	42 50
5	7 feet 8 inches, by 26 inches.	145 gallons.	40 00	6	8 feet 10 inches, by 27½ in.	180 gallons.	47 50
6	8 feet 10 inches, by 27½ in.	180 gallons.	45 00	7	8 feet 10 inches, by 27½ in.	210 gallons.	50 00

1860.

PRICES—Continued from page 2 of Cover.

1861.

Saw Mill, with 24 in. Circular Cross Cut Saw, and 14 in. Slitting Saw and Table,...	\$44 00
Saw Mill, with 24 in. Circular Cross Cut Saw, without Slitting Saw and Table,....	37 00
Saw Mill, with 5½ feet Drag Cross Cut Saw, with Truck and Log ways,.....	60 00
Saw Mill, with 5½ feet Drag Cross Cut Saw, without Truck and Log ways,	40 00
Shingle Machine, with 24 in. Circular Saw for Two Horse Power, with jointer,....	65 00
Shingle Machine, with 24 in. Circular Saw for Two Horse Power, without jointer,.	55 00
Shingle Sawing Attachment (for the \$37 Circular Saw Mill),	25 00
Corn Shellers, for Two Horse Power two sizes,	\$45 and 55 00
Feed Cutters for Corn Stalks, Straw, Hay, &c., for Power,	35 00
Feed and Grain Mill, (Iron), for Two Horse Power,	75 00
Feed and Grain Mill, (Iron), for Steam or Water Power,	125 00
Cider and Wine Mill and Press, for Hand or Horse Power,	50 00
Sugar Cane Mill, for Two Horse Power, suitable for ten acres, mounted on frame,..	120 00
Sugar Cane Mill, for Two Horse Power, suitable for ten acres, not mounted on frame,	100 00
Sugar Cane Mill, for Steam or Water Power, suitable for fifty acres,	300 00
Hay or Cotton Press (Portable), Bullock's Patent, three sizes, for horse power,	\$150, 135, 120 00
Hay and Cotton Press (Portable), "Ingersoll's Patent," for Hand Power, ...	\$50 to 80 00
Field Rollers (12 in. Iron Sections) 30 in. diameter, 6 sections,	50 00
\$5 less for each section less than six.	
Field Rollers (12 in. Iron Sections), 24 in. diameter, 6 sections,	45 00
\$5 less for each section less than six.	
Field Rollers (12 in. Iron Sections), 20 in. diameter, 5 sections.	35 00
\$5 less for each section less than five.	
Field Drills, for sowing all kinds of Grain in drills, with extra hopper for plaster,	
ashes, guano, &c.,	\$40 to 75 00
Field Drills, for sowing all kinds of Grain in drills, without extra hopper, ..	\$50 to 85 00
Field Sowing Machine, for sowing all grain broadcast, with extra hopper for plaster,	
Ashes, Guano, &c.,	\$45 to 60 00
Field Sowing Machines, for sowing all grain broadcast, without extra hopper for	
plaster, Guano, &c.,	\$35 to 50 00
Fanning Mills, Grant's Patent, No. 1, 18 in. Shoe, \$21; with Pulley for Power, ...	22 00
Fanning Mills, Grant's Patent, No. 2, 20 in. Shoe, \$23; with Pulley for Power, ...	24 00
Fanning Mills, Grant's Patent, No. 3, 22 in. Shoe, \$25; with Pulley for Power, ...	26 00
Fanning Mills, Grant's Patent, No. 4, 24 in. Shoe, \$27; with Pulley for Power, ...	28 00
Fanning Mills, Grant's Patent, No. 5, 26 in. Shoe, \$29; with Pulley for Power, ...	30 00
Fanning Mills, Grant's Patent, No. 6, 28 in. Shoe, \$31; with Pulley for Power, ...	32 00
Geddes Harrow, 26 Teeth,	\$13
Geddes Harrow, 22 Teeth,	\$12
Geddes Harrow, 18 Teeth,	\$10
Scotch Harrow, 50 Teeth,	12 00
Scotch Harrow, 40 Teeth,	10 00
Scotch Harrow, 30 Teeth,	8 00
Reaping Machines, with and without Mowers,	\$110 to 130 00
Mowing Machines,	100 to 120 00
Dog Power, for Churning,	15 00
Seed Planters, for Hills or Drills, Hand or Horse Power,	14 00
Horse Rakes, Revolving Wood Teeth,	\$4 to 8 00
Horse Rakes, Steel Wire Spring Teeth, with wheels,	20 00
Horse Rakes, Steel Wire Spring Teeth, without wheels,	12 00
Road Scrapers, 24 in. Iron,	\$5 00
Road Scrapers, 28 in. Iron,	7 25
Road Scrapers, 26 in. Iron,	6 00
Road Scrapers, 30 in. Iron,	8 50
Cheese Presses, for 25 lbs. to 300 lbs. Cheese,	\$6 to 16 00
Wind Mills, Holliday's Patent, for Pumping Water, &c.,	\$50 to 200 00

